PRC Environmental Management, Inc.
233 North Michigan Avenue
Suite 1621
Chicago, IL 60601
312-856-8700
Fax 312-938-0118

PRC

PRELIMINARY ASSESSMENT
VISUAL SITE INSPECTION

NORTHROP CORPORATION
ELECTRONIC SYSTEMS DIVISION
ROLLING MEADOWS, ILLINOIS
ILD 005 128 988

FINAL REPORT

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, DC 20460

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Prepared by	:	PRC Environmental Management, Inc. (Jeff Swano)
Contractor Project Manager	:	Shin Ahn
Telephone No.	:	(312) 856-8700
EPA Work Assignment Manager	:	Kevin Pierard
Telephone No.	:	(312) 886-4448

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EXECUTIVE SUMMARY

PRC Environmental Management, Inc. (PRC), performed a preliminary assessment and visual site inspection (PA/VSI) to identify and assess the existence and likelihood of releases from solid waste management units (SWMU) and other areas of concern (AOC) at the Northrop Corporation, Electronic Systems Division (Northrop) facility in Rolling Meadows, Cook County, Illinois. This summary highlights the results of the PA/VSI and the potential for releases of hazardous wastes or hazardous constituents from SWMUs and AOCs identified.

The Northrop facility employs about 2,700 people and is used as a research and development (R&D) and manufacturing facility to produce electronic countermeasures for the U.S. Department of Defense (DOD). Manufacturing activities include metal finishing, metal plating, and degreasing to produce printed wire board (PWB), electron tubes, and micro-integrated circuits (MIC). Wastes derived from the manufacturing processes consist of waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), waste filters (D011), spent solvents (F001, F002, F005, D001, D006, D007, D018, D035, D039), and miscellaneous wastes such as solvent-contaminated waste oil (F001), solvent-contaminated rags (F005, D001, D035), spent photodeveloper (D008), laboratory packs of expired chemicals (which the facility designates as LABP). Rinsing raw material drums generates empty drums and rinsate. The facility's wastewater treatment plant (WWTP) (SWMU 1), generates nonhazardous filter bags, photoresist solids, copper sheeting, and treated wastewater.

Waste acids, waste caustics, and waste cyanides are collected in Satellite Accumulation Areas (SWMU 8) and stored in segregated areas of Room 6419 (SWMU 3) prior to off-site disposal. Waste filters are placed in 55-gallon drums near the plating baths and transferred to Room 5097 (SWMU 5) when full prior to off-site disposal. Spent solvents were identified in the facility's original Part A permit application. All spent solvents, except for some freon, are collected in Satellite Accumulation Areas (SWMU 8) and stored in Room 5097 (SWMU 5) prior to off-site disposal. Spent freon is treated on site in stills (SWMU 6). The still bottoms are drummed and stored in Room 5097 (SWMU 5). Solvent-contaminated waste oil, solvent-contaminated rags, and spent photodeveloper are collected in Satellite Accumulation Areas (SWMU 8) and stored in Room 5097 (SWMU 5) prior to off-site disposal. Expired chemicals, such as polyeurethane coatings, lubricants, and detergents are

placed into lab packs and stored in Room 5097 (SWMU 5) prior to off-site disposal. Empty raw material drums are rinsed out, the rinsate is treated in the WWTP (SWMU 1), and the drums are stacked in the Empty Drum Storage Area (SWMU 7). Filter bags are accumulated in Room 6409 (SWMU 1) and disposed of off-site. Photoresist solids are drummed in Room 6409 (SWMU 1) and disposed of off-site in a municipal landfill. Copper sheeting is recovered in the WWTP in Room 6409 (SWMU 1) and recycled off site. Treated wastewater is discharged to the Municipal Water Reclamation District (MWRD) sewer system.

The facility began operations as a ham radio manufacturer in 1967; prior to that the property was farmland. In 1980, the facility submitted a Part A permit application indicating that it was a generator of spent solvents (F001, F003, D001, D007), and waste commercial chemicals (P030, P104, U151, U154). In 1983, the facility began producing PWB and, hence, generating waste acids, waste caustics, and waste cyanides. The facility's three buildings currently occupy 940,000 square feet of a 52-acre parcel of land in a light manufacturing area. The facility's current status is that of a large quantity generator of hazardous waste.

The PA/VSI identified the following eight SWMUs and one AOC at the facility:

Solid Waste Management Units

1. Wastewater Treatment Plant
2. Room 6407
3. Room 6419
4. Room 5087
5. Room 5097
6. Freon Stills
7. Empty Drum Storage Area
8. Satellite Accumulation Areas

Area of Concern

1. Former Underground Storage Tank Location

No releases from the facility to the environment have been documented. In July 1988, IEPA conducted an air pollution control inspection at the facility and found the facility did not have an air permit for a laser trimmer of MIC ceramics containing beryllium oxide. The facility was fined

$10,000 for the violation, but the state did not consider this an air release. No emergency or corrective actions have occurred at the facility.

In 1987, Northrop installed monitoring wells around the perimeter of the facility property to monitor groundwater quality due to concerns regarding industrial activities at neighboring properties. At this time, Northrop collected soil and groundwater samples. Soil sampling results revealed arsenic at 1.92 milligrams per kilogram (mg/kg) on the south boundary; arsenic at 1.83 mg/kg and chromium at 22.8 mg/kg on the east boundary; arsenic at 1.68 mg/kg, chromium at 46.5 mg/kg, and lead at 69.7 mg/kg on the north boundary. Groundwater sampling identified bromoform at 3.6 micrograms per liter from the north boundary. Groundwater is encountered at about 7 to 15 feet below ground surface at the facility. Groundwater flow beneath the facility appears to be to the northeast.

The primary source of drinking water in the vicinity of the facility is Lake Michigan, the intakes of which are located about 30 miles southeast of the facility. Groundwater is used as a municipal and private water supply. The City of Rolling Meadows has one municipal well located 0.25 mile south and downgradient of the facility and draws water from a sandstone aquifer. The Village of Palatine has six municipal wells. These wells are estimated to draw water from a limestone aquifer. Three of these wells are located within a 3-mile radius of the facility in Rolling Meadows: 0.25 mile north, 2 miles northwest, and 2.5 miles southwest of the facility. Groundwater from these wells is used only in emergencies and has not been used in over 10 years. Private drinking water wells within a 3-mile radius of the facility are located about 1 mile south and 1.5 miles southwest of the facility. The nearest residence is located about 0.25 mile north of the facility. The facility's east boundary is fenced. Security guards control the building entrances of the entire facility 24 hours per day because of Northrop's DOD-related activities.

No sensitive environments exist at the facility. The nearest sensitive environment is a 25-acre wetland located about 1.5 miles northwest of the facility. Endangered species listed for Cook County include Peregrine falcon (breeding habitat) and Prairie bush-clover. Prior to 1979, a marshy area was located in the northeast portion of the facility where the parking lot is currently located. According to facility personnel, this marshy area was filled in when the retention pond and parking lots were built in 1979-1980.

PRC recommends applying new epoxy floor covering for the floor in Room 6419 (SWMU 3). PRC recommends inspecting, sampling, and repairing the floor cracks present in Room 5097 (SWMU 5), and to reapply epoxy floor covering. For both Room 6419 (SWMU 3) and Room 5097 (SWMU 5), PRC recommends verifying that the facility's air permits include emissions from the exhaust vents located in those rooms. PRC recommends subsurface soil sampling the Former Underground Storage Tank Location (AOC 1) to determine if a release from the silicone-oil coolant tank occurred.

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), received Work Assignment No. R05032 from the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W9-0006 (TES 9) to conduct preliminary assessments (PA) and visual site inspections (VSI) of hazardous waste treatment and storage facilities in Region 5.

As part of the EPA Region 5 Environmental Priorities Initiative, the RCRA and CERCLA programs are working together to identify and address RCRA facilities that have a high priority for corrective action using applicable RCRA and CERCLA authorities. The PA/VSI is the first step in the process of prioritizing facilities for corrective action. Through the PA/VSI process, enough information is obtained to characterize a facility's actual or potential releases to the environment from solid waste management units (SWMU) and areas of concern (AOC).

A SWMU is defined as any discernible unit at a RCRA facility in which solid wastes have been placed and from which hazardous constituents might migrate, regardless of whether the unit was intended to manage solid or hazardous waste.

The SWMU definition includes the following:

- RCRA-regulated units, such as container storage areas, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells
- Closed and abandoned units
- Recycling units, wastewater treatment units, and other units that EPA has usually exempted from standards applicable to hazardous waste management units
- Areas contaminated by routine and systematic releases of wastes or hazardous constituents. Such areas might include a wood preservative drippage area, a loading or unloading area, or an area where solvent used to wash large parts has continually dripped onto soils.

An AOC is defined as any area where a release of hazardous waste or constituents to the environment has occurred or is suspected to have occurred on a nonroutine and nonsystematic basis. This includes any area where a strong possibility exists that such a release might occur in the future.

The purpose of the PA is as follows:

- Identify SWMUs and AOCs at the facility
- Obtain information on the operational history of the facility
- Obtain information on releases from any units at the facility
- Identify data gaps and other informational needs to be filled during the VSI

The PA generally includes review of all relevant documents and files located at state offices and at the EPA Region 5 office in Chicago.

The purpose of the VSI is as follows:

- Identify SWMUs and AOCs not discovered during the PA
- Identify releases not discovered during the PA
- Provide a specific description of the environmental setting
- Provide information on release pathways and the potential for releases to each medium
- Confirm information obtained during the PA regarding operations, SWMUs, AOCs, and releases

The VSI includes interviewing appropriate facility staff; inspecting the entire facility to identify all SWMUs and AOCs; photographing all visible SWMUs; identifying evidence of releases; making a preliminary selection of potential sampling parameters and locations, if needed; and obtaining additional information necessary to complete the PA/VSI report.

This report documents the results of a PA/VSI of the Northrop Corporation, Electronic Systems Division (Northrop) facility (EPA Identification No. ILD 005 128 988) in Rolling Meadows, Cook

County, Illinois. The PA was completed on May 5, 1993. PRC gathered and reviewed information from the Illinois Environmental Protection Agency (IEPA) and from EPA Region 5 RCRA files. The VSI was conducted on May 21, 1993. It included interviews with facility representatives and a walk-through inspection of the facility. PRC identified eight SWMUs and one AOC at the facility.

The VSI is summarized and 18 inspection photographs are included in Appendix A. Field notes from the VSI are included in Appendix B. Results from 1987 soil and groundwater sampling are included in Appendix C. A boring log, representative of the soil geology is included in Appendix D.

2.0 FACILITY DESCRIPTION

This section describes the facility's location; past and present operations; waste generating processes and waste management practices; history of documented releases; regulatory history; environmental setting; and receptors.

2.1 FACILITY LOCATION

The Northrop facility is located at 600 Hicks Road in Rolling Meadows, Cook County, Illinois. Figure 1 shows the location of the facility in relation to the surrounding topographic features (latitude 42° 05' 50" N and longitude 88° 02' 10" W). The three manufacturing buildings cover about 940,000 square feet of a 52-acre property in a light manufacturing area.

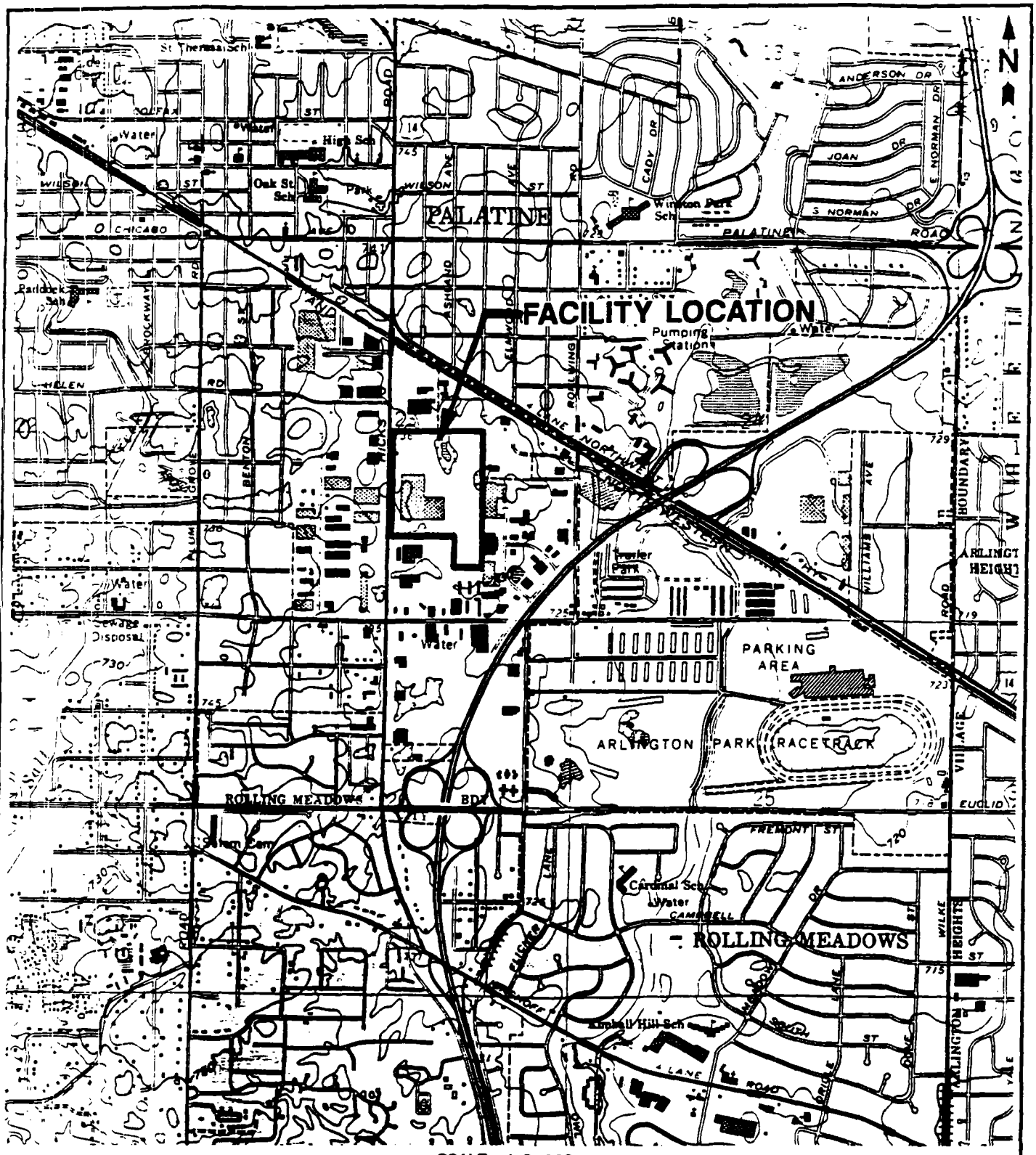
The facility is bordered on the north by trucking company and the village of Palatine, on the east by a chemical manufacturing company, on the south by a nail manufacturing company, and on the west by Hicks Road and the village of Palatine. A baseball field is located northeast of the facility.

2.2 FACILITY OPERATIONS

The Northrop facility is currently used as a research and development (R&D) and manufacturing facility to produce electronic countermeasures for the U.S. Department of Defense (DOD) and employs about 2,700 people. The components of these products are manufactured at the facility and include printed wire boards (PWB), electron tubes, and micro-integrated circuits (MIC).

Raw materials for production include copper sheeting, photoresist strips, lubricants, epoxies, polyurethane sealants, silicone adhesives, and solvents. Raw material chemicals are purchased in 5- and 55-gallon quantities and stored indoors.

PWB production began at the Northrop facility in 1983. To produce a PWB layer, a plastic circuit card is covered with copper sheeting. A photoresist strip, which is made of acrylic, is applied to the copper sheeting. An image of electronic circuitry is photographed onto the photoresist strip and developed at the facility like a photograph. The circuit card is then placed in a cupric chloride acid



SCALE: 1" = 2,000'

ILLINOIS

QUADRANGLE LOCATION

NORTHROP CORPORATION
ROLLING MEADOWS, ILLINOIS

FIGURE 1

FACILITY LOCATION

PRC ENVIRONMENTAL MANAGEMENT, INC.

SOURCE: MODIFIED FROM USGS, PALATINE, ILLINOIS, QUADRANGLE, 1980

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bath to etch off copper. After the acid bath, the PWB is rinsed in a caustic bath. Finally, the photoresist strip is removed in an acid bath leaving the electronic circuitry on the PWB. To permit solder points to be adhered to the PWB later in the production process, a photoresist strip is again applied to the PWB. The PWB is placed in a lead-tin plating bath and rinsed in a cyanide bath. The photoresist strip is removed in an acid bath and the lead-tin points remain. This entire process may be repeated in order to produce several layers of circuitry on one PWB. The number of processes and baths a PWB goes through varies depending on the PWB specifications.

To adhere solder points to a completed PWB, the PWB is cleaned with freon. Solder points are attached to the lead-tin points. Solder flux is removed from the PWB with freon. The PWB is cleaned with freon once more before a coat of polyeurethane sealant is applied to it.

Several PWBs can be laminated together to produce a PWB panel. Some PWB panels are drilled through in order to create electronic connections between the layers. The PWB panel is placed in a copper plating bath to fill the holes with a copper conduit. Panels are cleaned in a cyanide bath. Some PWBs require a protective nickel coating around the board edges to protect the metal. The PWB is placed in a nickel plating bath and rinsed in a cyanide bath. Other metal plating baths, such as gold and silver, are used on an as-needed basis. Most metal plating baths are replenished with additional metals and are not disposed of. Acid baths, caustic baths, and cyanide baths are either treated or disposed of.

Electron tube production began at the facility in the early 1970s. Electron tubes are made up of a series of intricately assembled, small metal components that resemble a stack of washers. The metal components are either machined in-house or purchased from other companies. Metal components are plated with nickel, copper, silver, or gold in plating baths in order to allow for a proper braze. After metal plating, the tubes are rinsed in a cyanide bath. To form a tube, metal components are usually brazed together but they can also be gas welded. Once a tube is formed it is evacuated to remove the air. A tube is cleaned frequently with freon or 1,1,1 trichloroethane (1,1,1 TCA). The tube is housed in a tin casing and wiring leads are soldered onto the casing. Finally, a silicone rubber is applied to seal the entire casing and wires. The finished tube is stored and sold as spare parts for radar jamming in older defense-related products.

MIC manufacturing consists of a ceramic substrate onto which various resistive and conductive components are added. Typically, silver and gold inks are printed on the ceramic substrate using a silk screening process. The MIC is degreased using freon. In order to fine-tune the electronic tolerances of the metal inks, a laser is used to remove ink from the ceramic substrate. The MIC is degreased again and tested. Next, transistors and resistors are manually and mechanically wire bonded to the MIC. The MIC is degreased again. Smaller components are attached to the MIC using adhesives. The MIC is degreased again, placed in a tin casing, and sealed. Sometimes a MIC will require etching in a nitric acid bath. Sometimes toluene is used as a degreaser.

These manufacturing activities generate waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), waste filters (D011), spent solvents (F001, F002, F005, D001, D006, D007, D018, D035, D039), and miscellaneous wastes such as solvent-contaminated waste oil (F001), solvent-contaminated rags (F005, D001, D035), spent photodeveloper (D008), laboratory packs of expired chemicals (LABP), empty drums, and raw material drum rinsate. The facility's wastewater treatment plant (WWTP), located in Room 6409 (SWMU 1) generates nonhazardous filter bags, nonhazardous photoresist solids, copper sheeting, and treated wastewater.

Hazardous wastes generated throughout the facility are collected in Satellite Accumulation Areas (SAA) (SWMU 8) and then transferred to accumulation areas (SWMUs 3 and 5) prior to off-site disposal. Wastewaters generated on site are drummed at their source and transferred to the WWTP (SWMU 1) where they are pretreated prior to discharge to the municipal sewer system. Wastewaters that cannot be treated on site are drummed and stored in SWMU 3 prior to off-site disposal. Most of the facility's spent freon is reclaimed on-site is a still (SWMU 6).

Prior to 1967, the property was farmland. The facility began operations in 1967 as a HAM radio manufacturer in a 208,000-square-foot building owned and operated by Hellicrafters, Inc. (Hellicrafters). Shortly thereafter, Northrop Corporation took over Hellicrafters, and the facility began DOD-related electronics manufacturing. Northrop has either constructed or expanded its manufacturing buildings in 1977, 1981, 1984, 1987, and 1993. The facility currently consists of three manufacturing buildings covering 940,000 square feet on a 52-acre parcel of land.

Prior to 1979, a marshy area was located in the northeast portion of the facility where a parking lot is currently located. This area was filled in 1979 to 1980, when the parking lot and retention pond were built (PRC 1994).

Solid wastes generated from facility operations and the SWMUs where they are managed are discussed in detail in Section 2.3.

2.3 WASTE GENERATION AND MANAGEMENT

This section describes waste generation and management at the Northrop facility. The facility's SWMUs are identified in Table 1. The facility layout, including SWMUs and AOCs, is shown in Figure 2. The facility's waste streams are summarized in Table 2.

The manufacturing operations that generate wastes include developing, metal finishing, metal plating, and degreasing. These operations generate waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), waste filters (D011) from cyanide baths, and spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039). Miscellaneous wastes generated throughout the facility include solvent-contaminated waste oil (F001) from machining pumps, solvent-contaminated rags (F005, D001, D035), spent photodeveloper (D008), lab packs of expired chemicals (which the facility designates as LABP) of expired chemicals, and nonhazardous empty drums. Rinsing out empty raw material drums generates raw material drum rinsate. The facility's WWTP (SWMU 1) treats spent acid baths, spent rinsing baths, and raw material drum rinsate, and generates nonhazardous filter bags, photoresist solids, copper sheeting, and treated wastewater. According to facility representatives, all wastes have been taken off-site for disposal since 1975. No records of on-site disposal of chemicals at the facility exist (PRC 1994). The waste streams produced by the manufacturing operations and the facility's waste management practices are discussed below.

Metal finishing operations occur during PWB and MIC production and generate some waste acids (D002, D007, D008) that cannot be treated in the WWTP (SWMU 1). Waste acids generated from finishing baths are either accumulated in 5-gallon containers or 55-gallon drums located in SAAs (SWMU 8). Once a container is full, it is moved to Room 6419 (SWMU 3); contents of 5-gallon

TABLE 1

SOLID WASTE MANAGEMENT UNITS

SWMU Number	SWMU Name	RCRA Hazardous Waste Management Unit[a]	Status
1	Wastewater Treatment Plant	Yes	Active; RCRA-closed in 1987
2	Room 6407	Yes	Inactive; RCRA-closed in 1987
3	Room 6419	No	Active; less than 90-day storage
4	Room 5087	Yes	Inactive; RCRA-closed in 1987
5	Room 5097	Yes	Active; less than 90-day storage; RCRA-closed in 1987
6	Freon Stills	No	Active
7	Empty Drum Storage Area	No	Active
8	Satellite Accumulation Areas	No	Active

Note:

[a] A RCRA hazardous waste management unit is one that currently requires or formerly required submittal of a RCRA Part A or Part B permit application.

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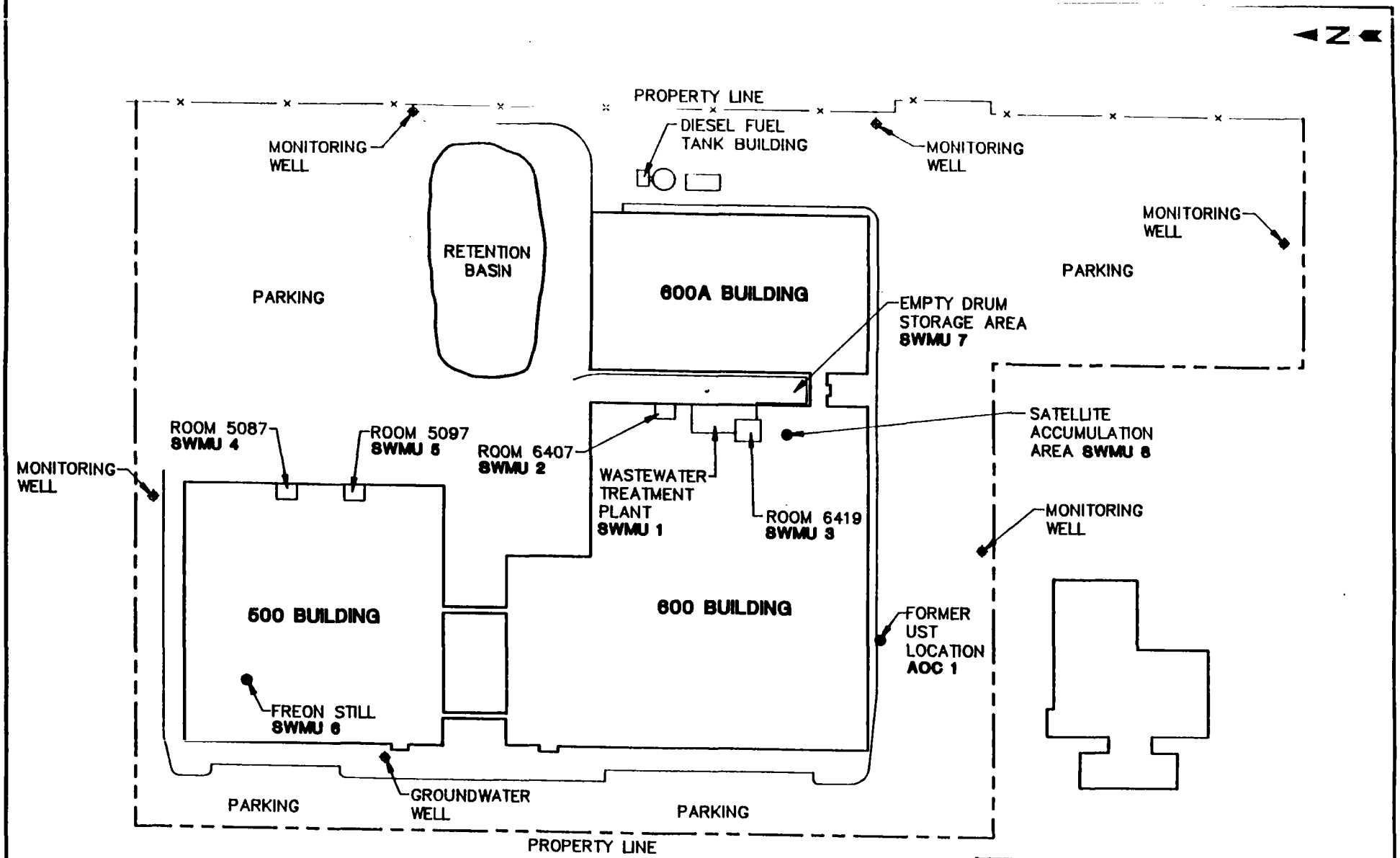

NORTHROP CORPORATION
ROLLING MEADOWS, ILLINOIS

FIGURE 2

FACILITY LAYOUT

SOURCE: MODIFIED FROM NORTHROP FACILITY SKETCH RECEIVED BY PRC ON MAY 21, 1993

NOT TO SCALE

PRC ENVIRONMENTAL MANAGEMENT, INC.

TABLE 2

SOLID WASTES

Waste/EPA Waste Code[a]	Source	Solid Waste Management Unit[b]
Waste acids/D002, D007, D008	PWB and MIC production	1, 2, 3, 4, 8
Waste caustics/D002, D008	PWB production	1, 2, 3, 4, 8
Waste cyanides/F007, D002, D011	PWB and electron tube production	1, 2, 3, 4, 8
Waste filters/D011	PWB and electron tube production	3, 8
Spent solvents/F001, F002, F003, F005, D001, D006, D007, D018, D035, D039	PWB and MIC production	1, 2, 4, 5, 6, 8
Solvent-contaminated waste oil/F001	Hot oil solder reflow machining pumps	5, 8
Solvent-contaminated rags/F005, D001, D035	Manufacturing; R&D	5, 9
Spent photodeveloper/D008	PWB manufacturing	5, 9
Raw material drum rinsate/D002, D007, D008	Drum cleaning	1
Lab packs/LABP[c]	Expired chemicals	5
Empty drums/NA	Manufacturing	7
Filter bags/NA	WWTP	1, 3
Photoresist solids/NA	WWTP	1, 3
Copper Sheeting/NA	WWTP	None
Treated wastewater/NA	WWTP	1

Notes:

[a] Not applicable (NA) designates nonhazardous waste.

[b] "None" indicates that the waste stream is not managed on site.

[c] This is the facility's waste code designation.

containers are transferred into a 55-gallon drum. Full drums in Room 6419 (SWMU 3) are prepared for off-site disposal. Since 1989, Clean Harbors of Chicago, Inc. (Clean Harbors) has transported the drums in a trailer truck to either its Chicago, Illinois or Braintree, Massachusetts facilities for wastewater treatment. The facility generated about 34,400 gallons of waste acids (D002, D007, D008) in 1992. Between 1986 and 1988, some waste acids (D002, D007, D008) were treated by Chem Clear, Inc. (CCI), of Chicago, Illinois. Between 1983 and 1990 some waste acids (D002, D007, D008) were also treated by Envirite Corporation (Envirite) in Harvey, Illinois. Waste acids that can be treated in the WWTP (SWMU 1) are placed in 55-gallon drums at the source of generation, stored next to the WWTP (SWMU 1), and treated on-site in batches.

Metal finishing operations also generate some waste caustics (D002, D008), used as rinses after acid baths, that cannot be treated in the WWTP. Waste caustics generated from rinsing baths are either accumulated in 5-gallon containers or 55-gallon drums located in SAAs (SWMU 8). Once a container is full, it is moved to Room 6419 (SWMU 3); contents of 5-gallon containers are then transferred into a 55-gallon drum. Full drums in Room 6419 (SWMU 3) are prepared for off-site disposal. Since 1990, Clean Harbors has transported the drums of waste in a trailer truck to its Chicago, Illinois facility for wastewater treatment. Since 1983, C. P. Inorganics, Inc. (CPI), has transported drums of waste in a trailer truck to its Joliet, Illinois facility for reclaiming. In 1992, the facility generated about 45,700 gallons of waste caustics (D002, D008), of which about 330 gallons were treated off-site by Clean Harbors and about 3,400 gallons were reclaimed off-site by CPI. Between 1983 and 1990, Envirite transported the wastes to its treatment facility. Between 1983 and 1989, some wastes were also treated by CCI. Waste caustics that can be treated in the WWTP (SWMU 1) are placed in 55-gallon drums at the source of generation, moved to be stored next to the WWTP (SWMU 1), and treated on-site in batches in the WWTP (SWMU 1).

Metal plating operations occur during PWB and electron tube production and generate waste cyanides (F007, D002, D011), none of which can be treated in the WWTP (SWMU 1). Waste cyanides generated from rinsing baths are either accumulated in 5-gallon containers or 55-gallon drums located in SAAs (SWMU 8). Once a container is full, it is moved to Room 6419 (SWMU 3); contents of 5-gallon containers are then transferred into a 55-gallon drum. Full drums in Room 6419 (SWMU 3) are prepared for off-site disposal. Since 1987, Cyanokem, Inc., has transported the drums of wastes in a trailer truck to its Detroit, Michigan facility for treatment. The facility generated about 30

gallons of waste cyanides in 1992. Once every 3 to 5 years, the facility generates about 55 gallons of potassium gold cyanide (F007), which is transported off site by SET Environmental Services, Inc., to the Handy and Harman, Inc. facility in Villa Park, Illinois for reclamation. In 1992, the facility generated about 15 gallons of this waste cyanide. Between 1983 and 1986, waste cyanide was treated by Nelson Industrial Services, Inc., in Detroit, Michigan.

Between 1983 and 1987, waste acids (D002, D007, D008), waste caustics (D002, D008), and waste cyanides (F007, D002, D011) were stored in Room 6409, where the WWTP (SWMU 1) is currently located. In addition, these wastes were stored in Room 6407 (SWMU 2) and Room 5087 (SWMU 4). No information is available on the specific wastes or waste quantities stored in these rooms during this time period.

Metal plating operations also generate waste filters (D011) used in silver cyanide plating baths for PWB and electron tube manufacturing. The facility began using filters in 1990. The filters are accumulated in 5-gallon buckets located in SAAs (SWMU 8) and transferred to 55-gallon drums in Room 6419 (SWMU 3). Since 1991, Environmental Systems Company, Inc. (ENSCO), has transported the drums of waste in a trailer truck to its incinerator in El Dorado, Arkansas. In 1992, the facility generated 193 pounds of waste filters.

Degreasing operations use freon, 1,1,1 TCE, and toluene. As a result, a variety of spent solvents (F001, F002, F003, D001, D006, D007, D018, D035, D039) are generated. All spent solvents are either accumulated in 5-gallon containers or 55-gallon drums located in SAAs (SWMU 8). Once a container is full, it is moved to Room 5097 (SWMU 5); contents of 5-gallon containers are then transferred into a 55-gallon drum. About 90 percent of spent freon (F001) regenerated in the Freon Stills (SWMU 6). Still bottoms from the Freon Stills (SWMU 6) are placed in 5-gallon buckets, transferred into 55-gallon drums, and stored less than 90 days in Room 5097 (SWMU 5). The 10 percent of spent freon that is not regenerated is accumulated in 55-gallon drums in Room 5097 (SWMU 5).

Full drums of all solvent wastes are prepared for off-site disposal. Since 1987, Safety-Kleen Corporation (Safety-Kleen) has transported the drums of all spent solvent wastes in a trailer truck to its fuel blending facility in Dolton, Illinois. Thereafter, the blended wastes are transported to cement

kilns to be burned as fuel. In 1992, the facility generated about 3,670 gallons of spent solvents. Between 1980 and 1989, LWD, Inc. transported some of the wastes to their incinerator in Calvert City, Kentucky. Between 1980 and 1988, BDT, Inc., transported some of the wastes to its incinerator in Clarence, New York. In 1986, McKesson Envirosystems, Inc. transported some of the wastes to its reclamation facility in Dolton, Illinois. No information is available on disposal practices prior to 1980.

Between 1983 and 1987, spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039) were stored in Room 6407 (SWMU 2), Room 5087 (SWMU 4), and Room 6409, where the WWTP (SWMU 1) is currently located. No information is available on the specific wastes or waste quantities stored in these rooms during this time period.

In 1989, the facility generated waste isopropanol (F003) from degreasing operations. This waste was either accumulated in 5-gallon containers or 55-gallon drums located in SAAs (SWMU 8). Once a container was full, it was moved to Room 5097 (SWMU 5); contents of 5-gallon containers were transferred into a 55-gallon drum. Full drums were prepared for off-site disposal. LWD, Inc., transported the drums to its Calvert City, Kentucky facility for incineration. In 1989, the facility generated about 385 gallons of waste isopropanol.

Solvent-contaminated waste oil (F001) is generated from hot oil solder reflow machining pumps. Solvent-contaminated waste oil is accumulated in 5-gallon buckets located in SAAs (SWMU 8). Once the container is full, it is moved to Room 5097 (SWMU 5) and its contents transferred to a 55-gallon drum. Full drums of waste are prepared for off-site disposal. Since 1989, Safety-Kleen has transported the drums of waste in a trailer truck to its fuel blending facility in Dolton, Illinois. Thereafter, the blended wastes are transported to cement kilns to be burned as fuel. In 1992, the facility generated about 1,045 gallons of solvent-contaminated waste oil.

Solvent-contaminated rags (F005, D001, D035) are generated throughout the manufacturing areas and R&D laboratories of the facility. Rags are placed in 5-gallon buckets with self-closing-lid SAAs (SWMU 8) and emptied nightly. The rags are stored in 55-gallon drums in Room 5097 (SWMU 5). Rineco transports drums of rags to its fuel blending facility in Benton, Arkansas where they are shredded. In 1992, the facility generated about 1,680 pounds of solvent-contaminated rags. From

1989 to 1993, ENSCO transported the rags to its El Dorado, Arkansas facility for incineration. Prior to 1989, LWD, Inc., transported the rags to its Calvert City, Kentucky facility for incineration.

Developing the photoresist strips used in PWB production, generates spent photodeveloper (D008). This waste is placed in 5-gallon buckets in SAAs (SWMU 8). Once the container is full, it is moved to Room 5097 (SWMU 5) and its contents transferred into a 55-gallon drum. Full drums of waste are prepared for off-site disposal. Between 1983 and 1989, CCI transported the drums of waste in a trailer truck to its wastewater treatment facility in Chicago, Illinois. In 1989 CCI became Clean Harbors and has transported the drums of waste in a trailer truck to its wastewater treatment facility in Chicago, Illinois. In 1992, the facility generated about 330 gallons of spent photodeveloper.

Occasionally, raw material chemicals expire and require disposal. DOD does not allow the use of expired materials in the products it buys. Northrop, however, re-evaluates chemicals to extend their shelf-life and attempts to find other uses for them because they are not substandard. These chemicals include polyeurethane coatings, lubricants, and detergents and are stored in Room 5097 (SWMU 5). If no alternative uses for expired chemicals can be identified, the facility prepares a labpack for off-site disposal. The facility designates the waste code for this waste as LABP. Since the late 1980s, Clean Harbors has transported lab packs in a trailer truck to its treatment facility in Chicago, Illinois. In 1992, the facility disposed of about 630 gallons of expired chemicals. Between 1982 and 1986, U.S. Ecology transported the wastes to its incinerator in Beaty, Nevada.

Empty drums from raw material chemicals are rinsed out using a continuous flow washing unit located near the plating bath lines. This generates raw material drum rinsate, which is treated in the WWTP (SWMU 1). Since 1987, the empty drums have been stacked in the Empty Drum Storage Area (SWMU 7) and have been picked up by either chemical distributors or chemical manufacturers to be reused. Prior to 1987, few drummed chemicals were used at the facility. At that time, empty drums were stored near the areas where the chemicals were being used. Off-site disposal then was the same as current operations.

The facility's WWTP (SWMU 1) became operational in 1990 and is maintained in Room 6409. The WWTP (SWMU 1) receives spent plating baths and rinse waters generated from metal plating operations and treats them in batches. Drums of wastes for the next batch are stored in Room 6409

near the WWTP (SWMU 1). The WWTP (SWMU 1) generates nonhazardous filter bags, photoresist solids, copper sheeting, and treated wastewater. Nonhazardous filter bags are air dried, placed in a 55-gallon SAA (SWMU 8), transferred to Room 6419 (SWMU 3) when full, and disposed of off-site in a landfill by Browning Ferris Industries (BFI). Nonhazardous photoresist solids are pressed to remove water and placed in a 2-cubic-yard hopper. The photoresist solids are then shoveled into 55-gallon drums and stored in Room 6419 (SWMU 3). BFI transports the photoresist solids off site for disposal in a landfill. Nonhazardous copper sheeting is generated from the a recovery tank of the WWTP (SWMU 1) equipped with an electrolytic cell. The copper sheeting is pulled off the cell and stacked nearby and eventually sold to off-site metals recyclers. Nonhazardous treated wastewater is discharged to the Metropolitan Water Reclamation District (MWRD) sewer system. MWRD monitors this effluent stream daily.

The PWB production process that generates spent bath and rinse waters began in 1983. Between 1983 and 1990, spent baths and rinse waters were bulked in 55-gallon drums and stored in Room 6409 (SWMU 1). Once per week, either Envirite or CCI of Chicago, Illinois pumped out the drums into a tanker truck and transported the wastes to its off-site treatment facilities.

2.4 HISTORY OF DOCUMENTED RELEASES

No releases from the facility to the environment have been documented. In 1987, Northrop installed monitoring wells around the northern, eastern, and southern perimeters of the facility property to monitor groundwater quality. This is because Northrop had concerns of industrial activities at neighboring properties; the facility is bordered on the east by a chemical manufacturer. At this time, Northrop collected soil and groundwater samples. Soil sampling results identified arsenic at 1.92 milligrams per kilogram (mg/kg) on the south boundary; arsenic at 1.83 mg/kg and chromium at 22.8 mg/kg on the east boundary; and arsenic at 1.68 mg/kg, chromium at 46.5 mg/kg, and lead at 69.7 mg/kg on the north boundary. Groundwater sampling identified bromoform at 3.6 micrograms per liter on the north boundary (Warzyn 1987). This report did not indicate the source of contamination. Northrop's consultant reported these results were consistent with results expected in an industrial area adjacent to a highway (PRC 1994). A copy of these results are included in Appendix C.

No further soil or groundwater sampling has been conducted at the Northrop facility. During the VSI, PRC did not observe any evidence of releases.

2.5 REGULATORY HISTORY

Northrop submitted a Notification of Hazardous Waste Activity form to EPA on August 15, 1980 indicating the facility both generated and treated, stored, or disposed of hazardous wastes (Northrop 1980a). Northrop submitted a RCRA Part A permit application on November 18, 1980 (Northrop 1980b). The permit application was for a 5,811-gallon container storage area in Room 5097 (SWMU 5), process code S01. Room 5097 (SWMU 5) stored waste solvents (F001, F002, F003, D001, D007). The application did not include electroplating wastes because they were not generated at that time. Information from Baxter and Woodman, Inc. (BAW), indicates Room 5097 (SWMU 5) was used only to store waste solvents (B&W 1986). This permit application erroneously indicated wastes being disposed of in an on-site landfill with an incorrect process code of D80. Waste code F006 was also listed erroneously because the facility did not treat wastewater at that time.

In December 1982, Northrop submitted a revised Part A permit application to increase its hazardous waste container storage capacity to 7,600 gallons (Northrop 1982b). In 1983, the facility began producing PWBs generating waste acids, caustics, and cyanides. In March 1984, Northrop submitted a revised Part A permit application to indicate the facility was increasing its hazardous waste storage capacity to 14,000 gallons and planned to treat about 20 gallons per day of hazardous wastes in Room 6409 (SWMU 1) (Northrop 1984a).

In 1984, Northrop submitted a supplemental waste stream permit application to accept waste from another Northrop plant in Elk Grove Village, Illinois. IEPA denied the application because the facility was not permitted to accept waste for storage (IEPA 1985a). IEPA discussed with Northrop the status of both facilities. IEPA determined that the Elk Grove Village facility could ship no more than 220 pounds of solvent wastes per month to the Rolling Meadows facility without permits or manifests (IEPA 1985b).

In December 1985, Northrop submitted a special waste stream application to store chromic plating bath waste from the Elk Grove Village plant and from a Northrop plant in Palatine, Illinois. IEPA

denied the application because Northrop had not been issued a development or operating permit for waste storage, waste treatment, or waste disposal operations. In addition, the waste analyses submitted with the application did not adequately characterize the wastes (IEPA 1986a). Northrop corrected these deficiencies and was allowed to receive and store wastes generated from other Northrop facilities (IEPA 1986c). A December 1986 compliance inspection conducted by IEPA determined that the wastes were properly manifested and transported from the other facilities, properly stored with wastes generated at the Northrop facility, and properly remanifested and transported for off-site disposal.

Northrop submitted a closure plan for its hazardous waste storage areas in April 1984 (Northrop 1984b). In December 1986, Northrop notified IEPA that the company had retained Baxter and Woodman, Inc. (B&W), to prepare a closure plan and oversee the implementation of the closure plan for the facility's hazardous waste storage areas (B&W 1986). Room 6409 (SWMU 1), Room 6407 (SWMU 2), Room 5087 (SWMU 4), and Room 5097 (SWMU 5) were the units to be closed. In January 1987, Northrop submitted a revised Part A permit application to indicate that Room 6409 (SWMU 1), Room 6407 (SWMU 2), and Room 5087 (SWMU 4) were being used to store volatile wastes (F001, F002, F003, D001, D007) and electroplating wastes (F007) (B&W 1986; Northrop 1987a). This revision did not indicate any treatment process codes, and it returned the waste storage capacity to 5,811 gallons (Northrop 1987a). IEPA received the closure plan on January 8, 1987 and approved it on March 9, 1987 (IEPA 1987b).

Closure included removing wastes and cleaning the four rooms, collecting samples, and disposing of all wastes. The rooms were emptied and cleaned prior to sampling activities. In March and April 1987, wipe samples for cyanide and metals were collected in Room 6409 (SWMU 1), Room 6407 (SWMU 2), Room 5087 (SWMU 4), and Room 5907 (SWMU 5) (B&W 1986). Between April and June 1987, about 60,000 pounds of waste were disposed of off site (B&W 1986). On July 14, 1987, B&W prepared a decontamination report, closure report, and closure certification for Northrop to submit to IEPA (B&W, 1987). On July 20, 1987, Northrop sent IEPA a Part A permit withdrawal request letter (Northrop 1987c).

In August 1987, IEPA determined that the closure of this facility was not conducted in accordance with the approved closure plan. Closure was not approved because the facility did not provide the

location of background samples; closure photographs revealed a significant floor crack in Room 5087 (SWMU 4), floor seams in Room 6407 (SWMU 2) and Room 5097 (SWMU 5), and drum stains on the floor in Room 5097 (SWMU 5). In addition, analyses from wipe samples collected in Room 6409 (SWMU 1), Room 6407 (SWMU 2), Room 5087 (SWMU 4), Room 5097 (SWMU 5) identified elevated levels of chromium, mercury, silver, and nickel (IEPA 1987c).

In October 1987, Northrop responded to the IEPA closure denial. Northrop provided a map of the locations of background samples. Northrop took two cores from the floor crack in Room 5097 (SWMU 5) and provided photographs of the cores. The photographs allegedly showed that the crack did not penetrate the concrete completely. Northrop considered the drum stains on the floor in Room 5097 (SWMU 5) to have been caused by rust. Northrop argued that because background samples were collected from very clean areas, the target goals for a remedial action should be adjusted to the concentrations found in the sampled areas, thereby allowing closure without remedial action (Northrop 1987d).

On November 2, 1987, IEPA inspected the Northrop facility and determined that closure had been completed in accordance with the approved closure plan. On December 21, 1987, IEPA notified Northrop that the agency approved of the closure and had withdrawn the Part A permit application to reflect the facility's status change. In addition, the agency returned Northrop's surety bond (IEPA 1987d).

The Northrop facility's current regulatory status is that of large-quantity generator of hazardous waste. The facility stores hazardous wastes for less than 90 days.

On March 23, 1982, IEPA conducted a RCRA compliance inspection at the Northrop facility. The inspection found numerous paperwork deficiencies including a lack of operating records and a contingency plan at the facility (IEPA 1982). IEPA notified Northrop on May 7, 1982, of the facility's deficiencies, and Northrop responded to the notification on May 24 (Northrop 1982a).

On December 19, 1986, IEPA conducted a RCRA compliance inspection at the Northrop facility. The inspection found that the facility did not have a waste analysis plan (IEPA 1986c; IEPA 1987a).

IEPA notified Northrop of the violations on February 6, 1987. Northrop responded to the notification on February 16, 1987 (Northrop 1987b).

On March 23, 1989, IEPA notified Northrop that the facility had not submitted a 1988 annual report (IEPA 1989). Northrop responded to the violation notice by submitting a 1988 annual report. Northrop considered that since the RCRA storage units were closed that annual reports were no longer required (Northrop 1989).

On July 7, 1988, IEPA conducted an air pollution control inspection at the Northrop facility. The inspection found that the facility did not have an air permit for a laser trimmer of MIC ceramics containing beryllium oxide. On July 21, 1988, IEPA notified Northrop of the violation and instructed the facility to obtain an air permit (IEPA 1988). In December 1988, Northrop submitted an air permit for the laser trimmer. IEPA rejected the permit due to insufficient sample analyses and gave Northrop 60 days to reapply (PRC 1993d). Northrop failed to respond within the allotted time; as a result, IEPA found Northrop in violation of Illinois administrative codes. On February 9, 1990, a hearing was held and Northrop agreed to pay a $10,000 civil penalty for the violations (Illinois Pollution Control Board 1990). Northrop filed an air permit application for the operations in April 1990, and on April 20, 1990, IEPA issued an air permit (IEPA 1990b). The facility is required to have operating air permits and currently has eight operating air permits. These permits are bubbled to cover other Northrop facilities in Palatine and Elk Grove Village, Illinois. The facility has no history of odor complaints from area residents.

In January 1985, IEPA issued Northrop a water pollution control (WPC) permit to operate water pollution control facilities (IEPA 1985c). This permit covered wastewaters from several production lines, cooling water, and sanitary waste. In February 1986, IEPA issued Northrop a WPC permit to operate an pretreatment recovery unit to remove metals with discharges to MWRD (IEPA 1986b). On January 30, 1990, IEPA issued Northrop a WPC permit to construct the facility's WWTP (IEPA 1990a).

All facility water discharges are to the MWRD which have been permitted and are monitored daily. The facility has no history of water discharge permit violations. Storm water runoff from the facility parking lots and roofs is channelled to a 2.5 acre-retention basin located near the northeast side of the

facility property. The retention basin does not have a discharge to any other sewer or surface water body. All other facility storm water runoff is directed into storm sewers that flow into Salt Creek.

The facility had one underground storage tank (UST) located at the Former Underground Storage Tank Location (AOC 1) on the southwest side of the facility. This UST contained silicone oil that was used as a coolant. It was excavated in 1977; however, no paperwork is available on whether the removal was approved, if the tank was leak-tested, or if any contamination remains.

2.6 ENVIRONMENTAL SETTING

This section describes the climate; flood plain and surface water; geology and soils; and groundwater in the vicinity of the facility.

2.6.1 Climate

The climate in Cook County is cold and snowy in winter and warm in summer. According to information from the U.S. Department of Agriculture (USDA), the average daily temperature in winter is 25 °F and in summer is 71 °F. The lowest average daily temperature is 13 °F in January. The highest average daily temperature is 82 °F in July (USDA 1979).

The average total annual precipitation for the county is 33 inches. Average seasonal snowfall is 39 inches (USDA 1979). The U.S. Department of Commerce (USDOC) lists mean annual lake evaporation for the area at about 30 inches (USDOC, 1968). The 1-year, 24-hour maximum rainfall is about 2.25 inches (USDOC 1963).

The average relative humidity in midafternoon in spring is less than 15 percent; during the rest of the year it is about 61 percent. Humidity is higher at night, and the average at dawn is about 80 percent (USDA 1979).

2.6.2 Flood Plain and Surface Water

Information from the Federal Emergency Management Agency (FEMA) indicates the Northrop facility is not located in a flood plain, but the area has been designated an area of minimal flooding (FEMA 1985). According to facility representatives, the water table is high in the area and the parking lots flood easily (PRC 1993a). The nearest surface water body is Salt Creek, located about 0.75 mile west of the facility. This creek is used for recreation and storm water runoff (PRC 1993b). Salt Creek flows south for about 36 miles to the Des Plaines River.

Storm water runoff from the facility parking lots and roofs flows into the retention basin located on the northeast side of the facility. Aboveground runoff from the Empty Drum Storage Area (SWMU 7) flows into the retention basin, which does not discharge to a sewer or surface water body (IT Corporation 1992). All other storm water runoff is directed to storm water sewers that flow into Salt Creek. Treated wastewater and sanitary water discharges to MWRD, which monitors the effluent daily.

2.6.3 Geology and Soils

Soils on the area of the facility consist of Urban land areas mixed with the Orthents Complex soils that have been altered. The Urban land aspects of the landscape have been covered by buildings and parking lots. The Orthents Complex areas consist of clayey, fine-textured soils. The soils formerly had a surface layer of silt loam, silty clay loam, or silty clay and a subsoil of silty clay or clay. The underlying material was calcareous silty clay loam. This unit is not assigned a suitability subclass. Low spots of Orthents soils collect water and dry slowly. Permeability is variable because the soil material is altered and has been compacted by construction equipment. Runoff is medium to very rapid, depending on slope and vegetation cover (USDA 1979).

Underlying the soils in the vicinity of the facility are thick, Wisconsinan age deposits of glacial till (Bogner 1976). The material primarily consists of clay and gravel from glacial outwash (Bogner 1976). Boring logs from monitoring wells installed on site indicate a predominance of stiff, silty clay (Warzyn Engineering, Inc. 1987). A sample boring log is included in Appendix D. The total

thickness of the unconsolidated units varies between 80 and 150 feet (Illinois Department of Public Health 1967).

Silurian age bedrock underlying the glacial deposits consists of Niagaran Dolomite. Ordovician age bedrock underlying the glacial deposits is composed of Maquoketa Shale (Bogner 1976).

2.6.4 Groundwater

Groundwater in the vicinity of the facility is encountered in shallow, perched aquifers; sand and gravel deposits in the glacial till; and deeper bedrock formations. Shallow aquifers exist between 4 and 30 feet below ground surface (bgs), at times daylighting in depressions. Sand and gravel deposits within the glacial till are encountered between 30 and 75 feet bgs. Dolomite and shale bedrock aquifers are located between 150 and 750 feet bgs; sandstone bedrock aquifers are located over 750 feet bgs (Illinois Department of Public Health, 1967; Bogner 1976).

Groundwater flow in shallow aquifers beneath the facility is unknown. Groundwater is encountered about 7 to 18 feet bgs. Groundwater flow appears to be northeast. Groundwater flow of other aquifers in the vicinity of the facility is unknown but most likely follows the topography of the area toward the south and east (USGS 1961; Bogner 1976).

2.7 RECEPTORS

The Northrop facility is located at 600 Hicks Road in Rolling Meadows, Cook County, Illinois. The facility property occupies 52 acres in a light manufacturing area. Rolling Meadows has a population of about 20,000, and Palatine has a population of about 30,000. The facility is bordered on the north by light manufacturing companies and the village of Palatine, on the east and south by light manufacturing companies, and on the west by Hicks Road and the village of Palatine. A baseball field is located near the facility's northeast corner. The nearest school is located about 0.75 mile northwest of the facility. The nearest residence is located about 0.25 mile north of the facility. The facility's east boundary is fenced. Security guards control the entrances to the entire facility 24 hours per day because of Northrop's DOD-related activities.

The nearest surface water body, Salt Creek, is located about 0.75 mile west of the facility and is used for storm water runoff and recreational purposes (PRC 1993b). Other surface water bodies in the area include small marshy areas in low-lying areas, ephemeral streams, and small unnamed lakes (USGS 1961). These surface water bodies are not used for drinking water purposes. The primary source of drinking water in the vicinity of the site is Lake Michigan. The intakes on Lake Michigan are located about 30 miles southeast of the facility (PRC 1993b; PRC 1993c).

Groundwater is used as a municipal and private water supply. The City of Rolling Meadows has one municipal well located 0.25 mile south and downgradient of the facility. This well is about 1,600 feet deep and draws water from a sandstone aquifer. About 60,000 gallons per month of this groundwater is blended with the Lake Michigan water prior to distribution (PRC 1993c). The Village of Palatine has six municipal wells. These wells are estimated to be about 170 feet deep and draw water from a limestone aquifer. Three of these wells are located within a 3-mile radius of the site: 0.25 mile north, 2 miles northwest, and 2.5 miles southwest of the facility. Groundwater from these wells is blended with Lake Michigan water prior to distribution only in emergencies and has not been used in over 10 years (PRC 1993b). Private drinking water wells within a 3-mile radius of the site are located about 1 mile south and 1.5 miles southwest of the facility in Rolling Meadows (PRC 1993b; PRC 1993c).

No sensitive environments exist at the facility. The nearest sensitive environment is a 25-acre wetland located about 1.5 miles northwest of the facility (USGS 1961). Endangered species listed by the U.S. Department of the Interior (DOI) for Cook County include Peregrine falcon (breeding habitat) and Prairie bush-clover (U.S. DOI 1989). Prior to 1979, a marshy area was encountered in the northeast corner of the facility where the parking lot is currently located. The marshy area was filled in when the retention pond was built in 1979-1980 (PRC 1994).

3.0 SOLID WASTE MANAGEMENT UNITS

This section describes the eight SWMUs identified during the PA/VSI. The following information is presented for each SWMU: description of the unit, dates of operation, wastes managed, release controls, history of documented releases, and PRC's observations. Figure 2 shows the SWMU locations.

SWMU 1 **Wastewater Treatment Plant**

Unit Description: This unit is maintained indoors on the east central side of 600 Building. This unit currently covers about 2,000 square feet. Spent acid and caustic baths are treated in batches, some of which are staged in 55-gallon drums on the north side of the room. This unit also treats raw material drum rinsate. Prior to closure, this unit measured 400 square feet and was used to store corrosive wastes and raw material chemicals.

Date of Startup: This unit began operations in 1983 for corrosives waste storage. Between 1984 and 1987, this unit was used for raw material chemicals storage. In 1990 the room was enlarged and the WWTP began operation.

Date of Closure: In 1984, the facility stopped storing wastes in this unit and began storing raw material chemicals. In 1987, IEPA approved RCRA closure of the unit.

Wastes Managed: This unit treats waste acids and waste caustics generated from metal finishing baths. Raw material drum rinsate is also treated. The WWTP generates nonhazardous filter bags and nonhazardous photoresist solids, which are disposed of off site in a municipal landfill; copper sheeting, which is recycled; and treated wastewater, which is discharged to MWRD and monitored daily. Between 1983

and 1984, this unit managed waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanide (F007, D002, D011), and spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039) stored in 55-gallon drums. No information is available on whether these incompatible wastes were isolated from one another. These wastes were either incinerated, treated, or reclaimed off site. In 1984, the facility stopped storing wastes in the unit, and from 1984 to 1987 raw material chemicals were stored in the unit.

Release Controls: This unit has always been maintained indoors and equipped with a sprinkler system and an emergency shower. The floors are recessed and sealed with an epoxy coating. No floor drains or windows are present in this unit.

History of Documented Releases: No releases from this unit have been documented.

Observations: PRC observed that this unit was in good condition and wastes were being well managed (see Photograph No. 1). The filter bags were air dried and then placed in a 55-gallon drum. Photoresist solids were pressed dry and dropped into a hopper (see Photograph No. 2) prior to being shoveled into a 55-gallon drum that was about half full. Copper sheeting was stacked near the ionizing unit that generates the copper sheeting (see Photograph No. 3).

SWMU 2 **Room 6407**

Unit Description: This unit is maintained indoors on the east central side of 600 Building north of Room 6409 (SWMU 1). This unit is currently used for raw material chemical storage. This unit was used to store hazardous wastes in 55-gallon drums for less than 90 days between 1983 and

	1984. This room measures 400 square feet and had a concrete floor. No floor drains are present in this room.
Date of Startup:	This unit began operations around 1983 for waste storage. Since 1984, this unit has been used for raw material chemicals storage.
Date of Closure:	In 1984, the facility stopped storing wastes in this unit and began storing raw material chemicals. In 1987, IEPA approved RCRA closure of the unit.
Wastes Managed:	No wastes are currently managed in this unit. Between 1983 and 1984, this unit managed waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), and spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039) stored in 55-gallon drums. No information is available on whether these incompatible wastes were isolated from one another. These wastes were either incinerated, treated, or reclaimed off site.
Release Controls:	This unit has always been maintained indoors and equipped with a sprinkler system. The floors are recessed and were covered with an epoxy coating when the unit stored wastes. This unit had a floor drain that was filled with concrete in late 1984. This drain was connected to the facility's sanitary sewers which discharged to and were monitored daily by MWRD. This unit is equipped with explosion proof lighting, blow-out panels, and a blow-off roof. No windows are present in this unit.
History of Documented Releases:	No releases from this unit have been documented.
Observations:	During the VSI, no wastes were stored in this unit. The unit currently stores freon and flammable raw materials (see Photograph No. 4).

	The floor has seams, and PRC observed some cracks. The epoxy coating on the floor appeared to be eroding. PRC observed some staining on the floor but could not determine the source. PRC did not observe the floor drain that had been filled in 1984.
SWMU 3	**Room 6419**
Unit Description:	This unit is maintained indoors on the east central side of 600 Building south and adjacent to the WWTP (SWMU 1). This unit is currently used to store all hazardous corrosive wastes in drums that are to be shipped off site for treatment. This unit measures about 800 square feet and has a concrete floor that is tiled in some areas, bare in others, and epoxy-coated in others. No floor drains are present in this room. This room was not included on the facility's original or revised Part A permit applications.
Date of Startup:	This unit began operation in 1988.
Date of Closure:	This unit is active for storing hazardous wastes for less than 90-days.
Wastes Managed:	This unit manages waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), waste filters (D011), nonhazardous filter bags, and nonhazardous photoresist solids. Berms and walls are used to keep incompatible wastes separated. The hazardous wastes are transported off site for either treatment or reclamation. The nonhazardous wastes are disposed of off site in a municipal landfill.
Release Controls:	In this unit, the northern half of the floor is bermed and has an epoxy-coated concrete area, a tiled concrete area, and a bare concrete area. The southern half of the floor is bare concrete. The room is equipped

	with a sprinkler system. No floor drains or windows are present in this unit.
History of Documented Releases:	No releases from this unit have been documented.
Observations:	At the time of the VSI, 3 55-gallon drums of waste cyanide were located under a ventilation hood. At this hood, 5-gallon buckets of wastes, collected in SAAs (SWMU 8), are transferred into 55-gallon drums. This vent has been operating since 1989 and leads directly outdoors. In addition to these drums, the room contained 7 55-gallon drums of waste acids, 13 55-gallon drums of waste caustics, 7 drums of waste cyanides, and 2 55-gallon drums of nonhazardous filter bags. A concrete berm has been constructed in the middle of the room (see Photograph No. 5). PRC observed some drum ring marks on the floor south of the bermed area.
SWMU 4	**Room 5087**
Unit Description:	This unit is maintained indoors on the east central side of the 500 Building. This unit is currently used as a testing facility for finished products but was used to store hazardous wastes in 55-gallon drums between 1982 and 1984. This room measures 400 square feet and has a tiled concrete floor. No floor drains are present in this room.
Date of Startup:	This unit began storing waste for less than 90 days around 1983. Between 1984 and 1987, this unit was used for raw material chemicals storage. Currently, the unit is used for testing finished products.
Date of Closure:	In 1984, the facility stopped storing wastes in this unit and began storing raw material chemicals. In 1987, IEPA approved RCRA closure of the unit.

Wastes Managed:	No wastes are currently managed in this unit. Between 1983 and 1984, this unit managed waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), and spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039) stored in 55-gallon drums. No information is available on whether these incompatible wastes were isolated from one another. These wastes were either incinerated, treated, or reclaimed off site.
Release Controls:	This unit has always been maintained indoors and equipped with a sprinkler system. The floors are not recessed but were coated with epoxy when the unit stored wastes. This unit has no floor drains and no windows.
History of Documented Releases:	No releases from this unit have been documented.
Observations:	PRC observed finished products on shelves (see Photograph No. 6). This unit contains diagnostic equipment to test finished products. The floor was tiled; no floor drains were observed.

SWMU 5 **Room 5097**

Unit Description:	This unit is maintained indoors on the east central side of the 500 Building south of Room 5087 (SWMU 4). This unit is currently used to store all waste solvents in 55-gallon drums for less than 90 days. This room measures about 400 square feet and has a concrete floor that is bare in some areas and epoxy-coated in others. No floor drains are present in this room. This was the only room included on the facility's original Part A permit application.
Date of Startup:	This unit began operation in 1980.

Date of Closure:	In 1987, IEAP approved RCRA closure of the unit. This unit is currently used for less than 90-day storage of hazardous waste.
Wastes Managed:	This unit manages spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039), solvent-contaminated waste oil (F001), solvent-contaminated rags (F005, D001, D035), spent photodeveloper (D008), and LABPs of expired chemicals. These wastes are transported off site for either fuel blending or treatment.
Release Controls:	This unit has always been maintained indoors and equipped with a sprinkler system. The floors are recessed and partially covered with an epoxy coating. This unit has no floor drains and no windows. This unit is equipped with explosion proof lighting, blow-out panels, and a blow-off roof.
History of Documented Releases:	No releases from this unit have been documented.
Observations:	At the time of the VSI, two 55-gallon drums of spent freon were located under a ventilation hood (see Photograph No. 7). At this hood, 5-gallon buckets of wastes, collected in SAAs (SWMU 8), are transferred into 55-gallon drums. This vent has been operating since 1981 and leads directly outdoors, but it is not covered by an operating permit. The unit also stored eight 55-gallon drums of spent solvents, one 55-gallon drum of solvent-contaminated waste oil, one 5-gallon bucket of solvent-based paint, seven 55-gallon drums of nonhazardous waste, and six empty 55-gallon drums (see Photograph No. 9). PRC observed stains on the floor and areas where the epoxy coating is wearing away. No floor drains were observed in this unit. Shelving on the north side of the room stores expired chemicals that are awaiting other uses (see Photograph No. 8).

SWMU 6	**Freon Stills**
Unit Description:	Two stills are located indoors in the 500 Building where degreasing activities occur. One unit is an Electrovert degreaser and still. The other unit is a Barron-Blakeslay degreaser and still. Each has a 220-gallon capacity. The rate of regeneration varies with the facility's production level. The floors in these areas are tiled and do not have floor drains.
Date of Startup:	These units began operation in 1990.
Date of Closure:	The units are active.
Wastes Managed:	These units are used to distill dirty freon used in degreasing operations. In 1992, the facility recycled about 810 gallons of freon. Still bottoms generated from the distillation process are placed in 5-gallon buckets SAAs (SWMU 8), transported to Room 5097 (SWMU 5), transferred into 55-gallon drums and stored prior to being disposed of off site.
Release Controls:	The one unit observed by PRC is maintained indoors on a tiled floor with no floor drains in the vicinity.
History of Documented Releases:	No releases from these units have been documented.
Observations:	At the time of the VSI, one still was out of service, and the other was not in use (see Photograph No. 10). PRC observed only the operating unit and it appeared to be in good condition. PRC observed no evidence of release.

SWMU 7	**Empty Drum Storage Area**
Unit Description:	This unit is maintained on an asphalt paved area outdoors between the 600 Building and the 600A Building. The total area used for drum storage is about 650 square feet. Empty drums from raw material chemicals are rinsed in a continuous-flow washer for a few minutes in the PWB production wet process area in Room 6424. The rinse water is treated in the WWTP (SWMU 1). The drums are then stored outdoors to be picked up by chemical distributors or manufacturers for reuse.
Date of Startup:	This unit is estimated to have begun operating in 1987.
Date of Closure:	This unit is active.
Wastes Managed:	This unit manages empty drums that contained raw material acids, caustics, ,1,1,1 TCA, and toluene. Prior to storage, the drums are rinsed. Empty drums are picked up by chemical distributors and manufacturers to be reused. Prior to 1987, few drummed products were used. At that time, empty drums were stored near the areas where they were used. Off-site disposal was identical to current management practices.
Release Controls:	The drums are rinsed and drained prior to storage. The pavement slopes to a storm water sewer that flows into the retention basin (IT 1992).
History of Documented Releases:	No releases from this unit have been documented.
Observations:	PRC observed empty drums stored on their sides up to five drums high. Drums are stored on east and west sides of the pavement

	between the two buildings. The pavement slopes north toward a storm water sewer. At the time of the VSI, about 100 drums were being stored (see Photograph Nos. 11 and 12). PRC observed a 1.5-foot-radius stain of unknown origin on the asphalt about 20 feet north of the drum storage and upgradient from the storm sewer. It appeared this stain could have been from trucks parked in the area to pick up drums.
SWMU 8	**Satellite Accumulation Areas**
Unit Description:	These areas are maintained indoors and are located near production areas and laboratories. These areas consist of 5-gallon buckets or 55-gallon drums.
Date of Startup:	These areas began operating in 1967.
Date of Closure:	These areas are active.
Wastes Managed:	These units manage waste acids (D002, D007, D008), waste caustics (D002, D008), waste cyanides (F007, D002, D011), spent solvents (F001, F002, F003, F005, D001, D006, D007, D018, D035, D039), solvent-contaminated waste oil (F001), solvent-contaminated rags (F005, D001, D035), spent photodeveloper (D008). These wastes are stored in either 5-gallon buckets or 55 gallon drums for treatment or reclamation off site.
Release Controls:	All containers are stored closed and maintained indoors.
History of Documented Releases:	No releases from these areas have been documented.

Observations:

PRC observed numerous satellite accumulation areas throughout the facility, consisting of a variety of containers (see Photograph Nos. 13 through 17). All containers were stored closed and appeared to be in good condition. Floor drains were not present near these areas except for drums in the PWB area. The PWB area has floor drains and a sump that are connected to the facility's WWTP.

4.0 AREAS OF CONCERN

PRC identified one AOC during the PA/VSI. This AOC is discussed below; its location is shown in Figure 2.

AOC 1 Former Underground Storage Tank Location

This AOC is located outside the southwest corner of the 600 Building (see Photograph No. 18). This 500-gallon, steel UST was installed about 1971 and was used to store a silicone-oil coolant. The tank was excavated in 1977, but no soil sampling or leak testing was conducted to verify that no releases to subsurface soils had occurred. No documentation exists of state or local approval of the tank removal. According to facility representatives, the tank was taken off site and used to store diesel fuel, implying that the tank was in good condition.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The PA/VSI identified eight SWMUs and one AOC at the Northrop facility. Background information on the facility's location; operations; waste generating processes and waste management practices; history of documented releases; regulatory history; environmental setting; and receptors is presented in Section 2.0. SWMU-specific information, such as the unit's description, dates of operation, wastes managed, release controls, history of documented releases, and observed condition, is presented in Section 3.0. AOCs are discussed in Section 4.0. Following are PRC's conclusions and recommendations for each SWMU and AOC. Table 3, located at the end of this section, summarizes the SWMUs and AOCs at the facility and the recommended further actions.

SWMU 1 **Wastewater Treatment Plant**

Conclusions: Between 1983 and 1984, this unit was used to store a variety of wastes generated at the facility. IEPA approved closure of this unit in 1987. The potential for release to environmental media is low.

Recommendations: PRC recommends no further action for this SWMU at this time.

SWMU 2 **Room 6407**

Conclusions: Between 1983 and 1984, this unit was used to store a variety of wastes generated at the facility. IEPA approved closure of this unit in 1987. The unit is maintained indoors and is currently used for raw material chemicals storage. The potential for release to environmental media is low.

Recommendations: PRC recommends no further action for this SWMU at this time.

SWMU 3 **Room 6419**

Conclusions: This unit began operating in 1988 and is currently used to store for less than 90 days any hazardous corrosive waste that cannot be treated in the WWTP.

The unit is maintained indoors. The potential for release to environmental media is low.

Recommendations: PRC recommends applying epoxy to bare concrete areas on the southern half of the room. PRC also recommends determining if a distinct air permit is needed for the exhaust vent.

SWMU 4 **Room 5087**

Conclusions: Between 1983 and 1987, this unit was used to store a variety of wastes generated at the facility. IEPA approved closure of this unit in 1987. The unit is maintained indoors and is currently used for testing finished products. The potential for release to environmental media is low.

Recommendations: PRC recommends no further action for this SWMU at this time.

SWMU 5 **Room 5097**

Conclusions: Between 1980 and 1987, this unit was used to store solvent wastes. IEPA approved closure of this unit in 1987. This unit is currently used for less than 90-day storage of solvent wastes only. The potential for release to environmental media is low.

Recommendations: PRC recommends inspecting, sampling, and repairing floor cracks. PRC also recommends reapplying epoxy coating to the floor surface and determining if a distinct air permit is needed for the exhaust vent.

SWMU 6 **Freon Stills**

Conclusions: The facility began using freon stills in 1990. Currently one is out of service and one is operated in the facility. Freon is used as a degreaser, and dirty freon is distilled and reused. Still bottoms are collected in 55-gallon drums

and stored in Room 5097 (SWMU 5) prior to being disposed of off site. The potential for release to environmental media is low.

Recommendations: PRC recommends no further action for this SWMU at this time.

SWMU 7 **Empty Drum Storage Area**

Conclusions: This unit is maintained outdoors and upgradient from a storm water sewer that flows into the retention basin. Drums from raw material chemicals are rinsed in a continuous-flow washer for a few minutes. The rinsewater is treated in the WWTP located in Room 6409 (SWMU 1). The empty drums are then stored outdoors to be picked up by chemical distributors or manufacturers for reuse. The potential for release to environmental media is low.

Recommendations: PRC recommends no further action for this SWMU at this time.

SWMU 8 **Satellite Accumulation Areas**

Conclusions: These units have been active since the facility began operation. Either 5-gallon buckets or 55-gallon drums are used to accumulate wastes near their point of generation. These units are maintained indoors and can be located near all manufacturing areas and laboratories within the facility. The potential for release to environmental media is low.

Recommendations: PRC recommends no further action for this SWMU at this time.

AOC 1 **Former Underground Storage Tank Location**

Conclusions: Between 1971 and 1977, this tank was used to store a silicone-oil coolant. It was excavated in 1977; however, no samples were collected, the tank was not leak tested, and no documentation exists on whether the removal was approved by state or local authorities.

Recommendations: PRC recommends collecting subsurface soil samples to verify that no releases from the tank occurred.

TABLE 3

SWMU AND AOC SUMMARY

SWMU	Dates of Operation	Evidence of Release	Recommended Further Action
1. Wastewater Treatment Plant	1983 to 1987; 1990 to present	None	None
2. Room 6407	1983 to 1987	None	None
3. Room 6419	1988 to present	None	Apply new epoxy floor covering; obtain air permit if necessary
4. Room 5087	1983 to 1987	None	None
5. Room 5097	1980 to present RCRA-closed in 1987	None	Inspect, sample, and repair floor cracks; reapply epoxy floor covering; obtain air permit if necessary
6. Freon Stills	1990 to present	None	None
7. Empty Drum Storage Area	1987 to present	None	None
8. Satellite Accumulation Areas	1967 to present	None	None

AOC	Dates of Operation	Evidence of Release	Recommended Further Action
1. Former UST Location	1971 to 1977	None	Collect subsurface soil samples

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APPENDIX A

VISUAL SITE INSPECTION SUMMARY AND PHOTOGRAPHS

(11 Pages)

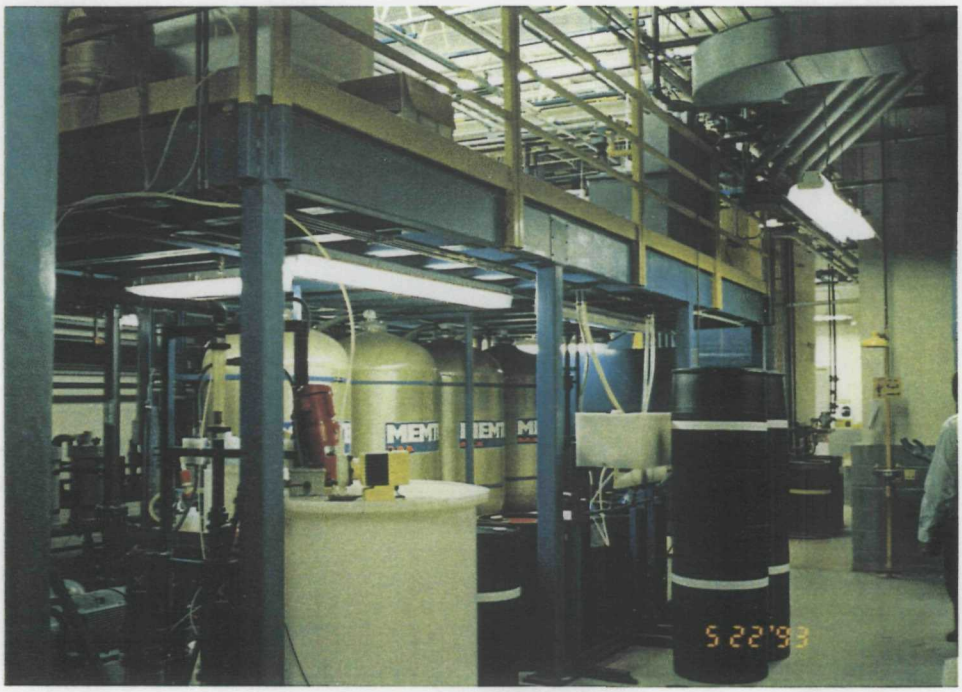
VISUAL SITE INSPECTION SUMMARY

Northrop Corporation, Electronics Systems Division
600 Hicks Road
Rolling Meadows, Illinois 60008
ILD 005 128 988

Date:	May 21, 1993
Primary Facility Representative:	David A. Gurrie
Representative Telephone No.:	(708) 259-9600
Additional Facility Representatives:	Edward F. Glod Eric B. Howell William A. Cameron
Inspection Team:	Jeff Swano, PRC Environmental Management, Inc. (PRC) Ron Baker, PRC
Photographer:	Ron Baker
Weather Conditions:	Sunny, calm, about 65 °F
Summary of Activities:	The visual site inspection (VSI) began at 8:15 a.m. with an introductory meeting. The inspection team explained the purpose of the VSI and the agenda for the visit. Facility representatives then discussed the facility's past and current operations, solid wastes generated, and release history. Facility representatives provided the inspection team with copies of requested documents. The VSI tour began at 12:00 p.m. outside of the facility by the Former Underground Storage Tank Location (AOC 1). The inspection team walked around the outside of the entire facility and observed the retention basin, the Empty Drum Storage Area (SWMU 7). The inspection team then went inside to observe the manufacturing processes and waste management practices. The inspection team observed the printed wire board (PWB) area and SAAs (SWMU 8). The team then entered Room 6409 and observed the WWTP (SWMU 1). The inspection team next entered Room 6407 (SWMU 2) and saw that raw material chemicals were being stored in this room. Next the inspection team entered Room 6419 (SWMU 3) and observed how corrosive wastes are handled. The inspection team entered assembly area and an engineering laboratory and saw more SAAs (SWMU 8). After obtaining security clearance, the team entered Room 5087

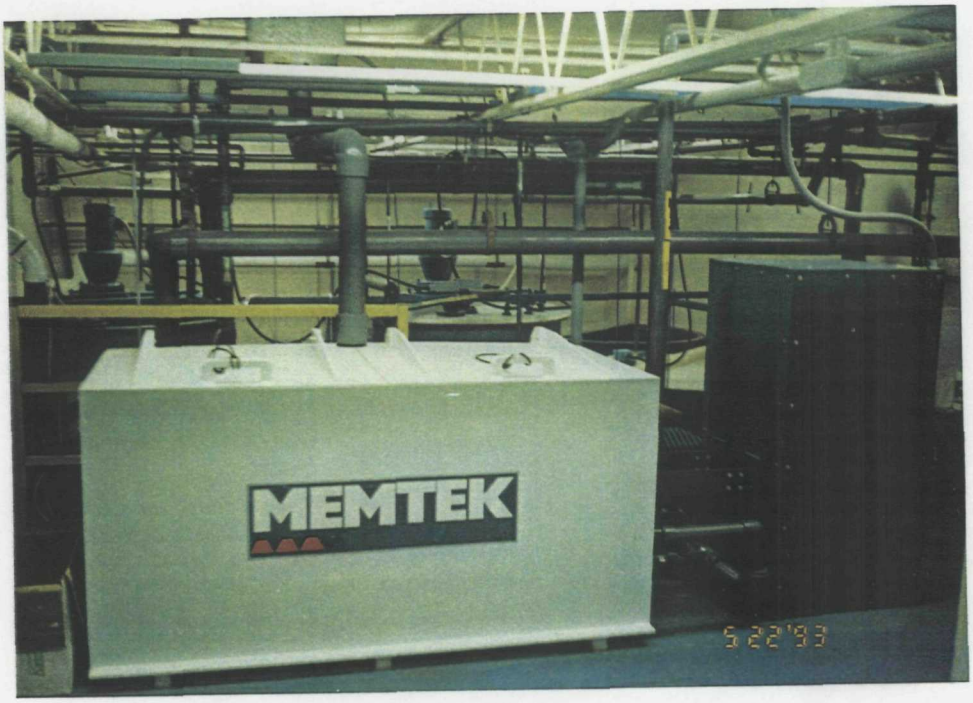
(SWMU 4) and observed testing of finished products. The inspection team entered a large assembly area and observed a Freon Still (SWMU 6). The team next entered Room 5097 (SWMU 5) and observed how solvent wastes are handled.

The tour concluded at 3:50 p.m., after which the inspection team held an exit meeting with facility representatives. The VSI was completed and the inspection team left the facility at 4:30 p.m.

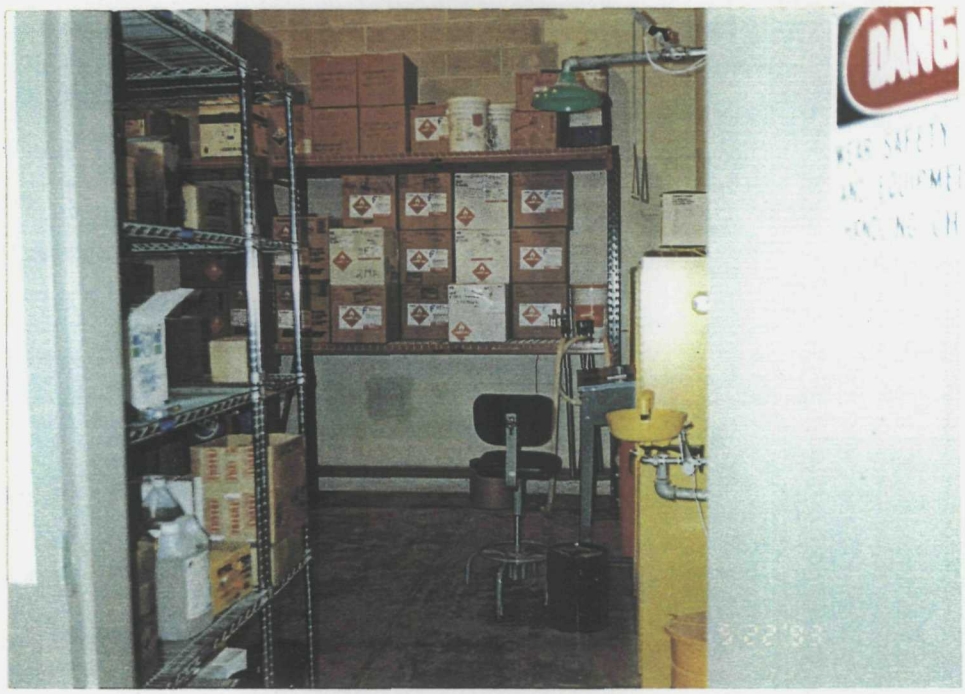


Photograph No. 1 Location: SWMU 1
Orientation: Southeast Date: 05/21/93
Description: Partial perspective of the WWTP (SWMU 1).

Photograph No. 2 Location: SWMU 1
Orientation: West Date: 05/21/93
Description: Hopper containing photoresist solids generated in the WWTP (SWMU 1). The drum in the foreground contains photoresist solids.



Photograph No. 3 Location: SWMU 1
Orientation: North Date: 05/21/93
Description: Ionizing tank of the WWTP (SWMU 1) that regenerates copper sheeting.

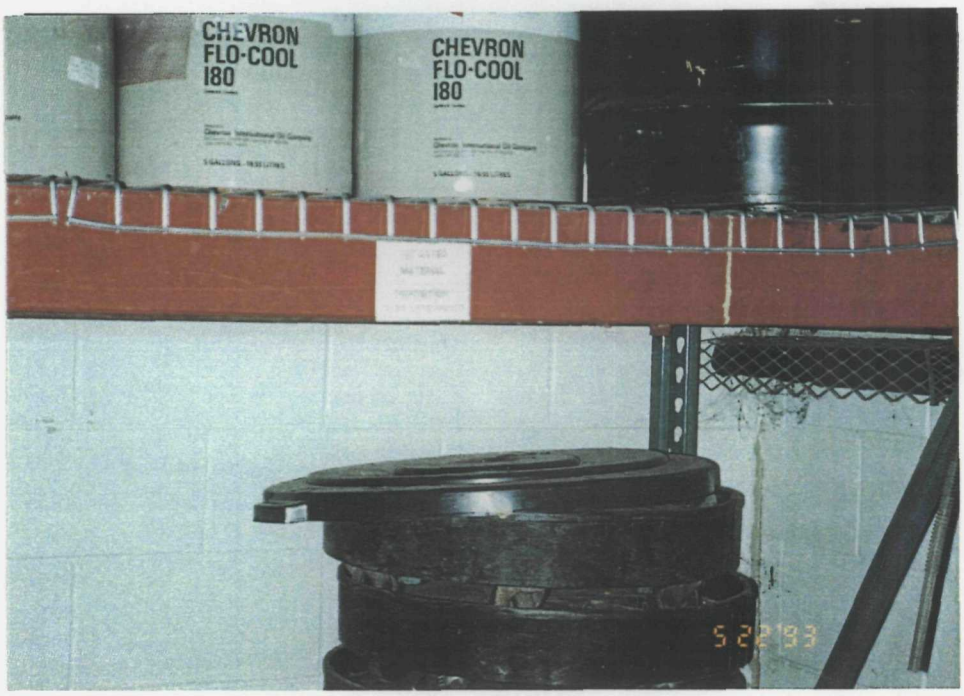


Photograph No. 4 Location: SWMU 2
Orientation: East Date: 05/21/93
Description: Room 6407 (SWMU 2) was formerly used as a hazardous waste storage room; it is currently used to store raw material chemicals.

Photograph No. 5 Location: SWMU 3
Orientation: East Date: 05/21/93
Description: Room 6419 (SWMU 3) is the corrosives waste storage room. The northern half of floor is bermed; the southern half of floor is bare concrete; the ventilation hood is located to the left and marked with a caution sign.

Photograph No. 6 Location: SWMU 4
Orientation: Southeast Date: 05/21/93
Description: Room 5087 (SWMU 4) was formerly used to store hazardous waste. It is currently used to test finished products.

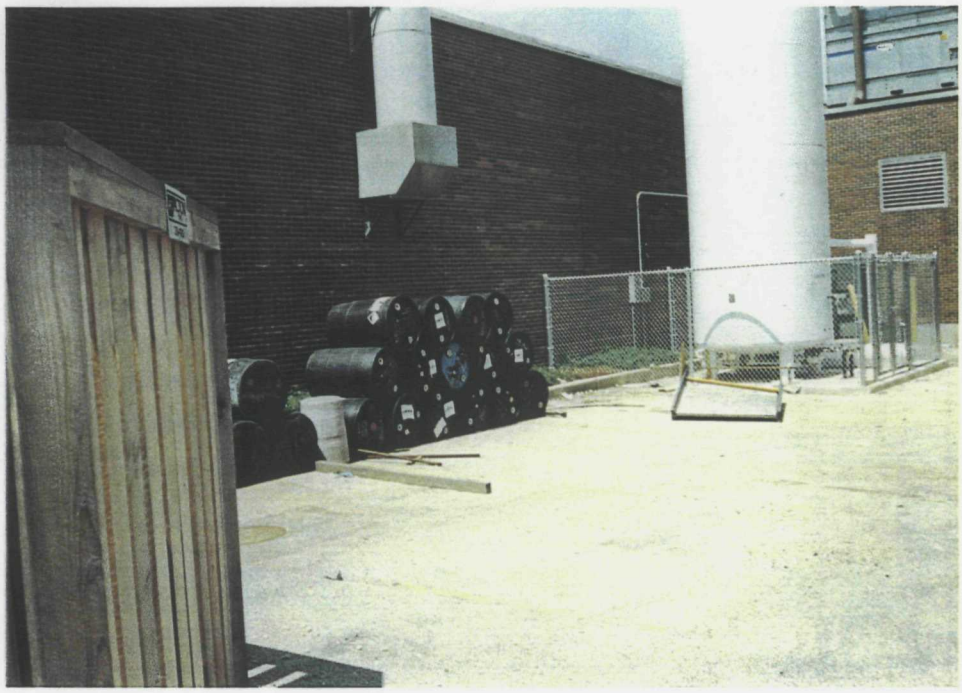
Photograph No. 7 Location: SWMU 5
Orientation: East Date: 05/21/93
Description: Room 5097 (SWMU 5) is the solvent waste storage room. Note the ventilation hood. Also, note the eroding epoxy floor covering.



Photograph No. 8 Location: SWMU 5
Orientation: North Date: 05/21/93
Description: Room 5097 (SWMU 5); expired chemicals storage shelf at north end of room. Sign on shelf reads "out dated material disposition to be determined".

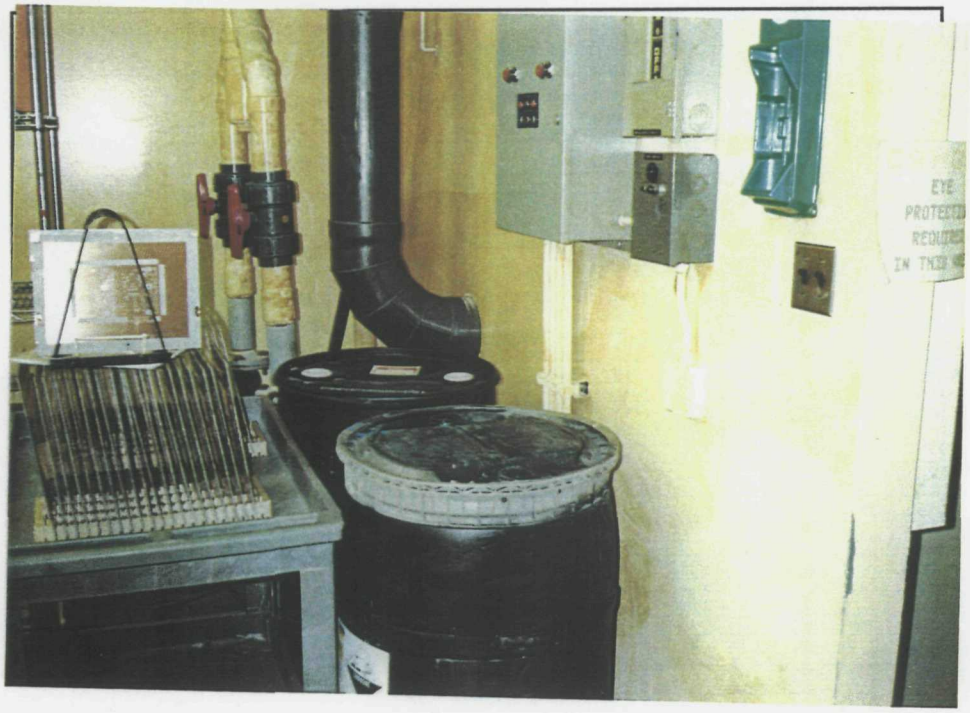
Photograph No. 9 Location: SWMU 5
Orientation: North Date: 05/21/93
Description: Room 5097 (SWMU 5); drum storage in north half of room. Note expired chemical storage on shelves in foreground and on back wall.

Photograph No. 10 Location: SWMU 6
Orientation: East Date: 05/21/93
Description: Freon Still (SWMU 6); dark blue objects in the foreground and in the background are the Electrovert's degreaser and a freon still, respectively.



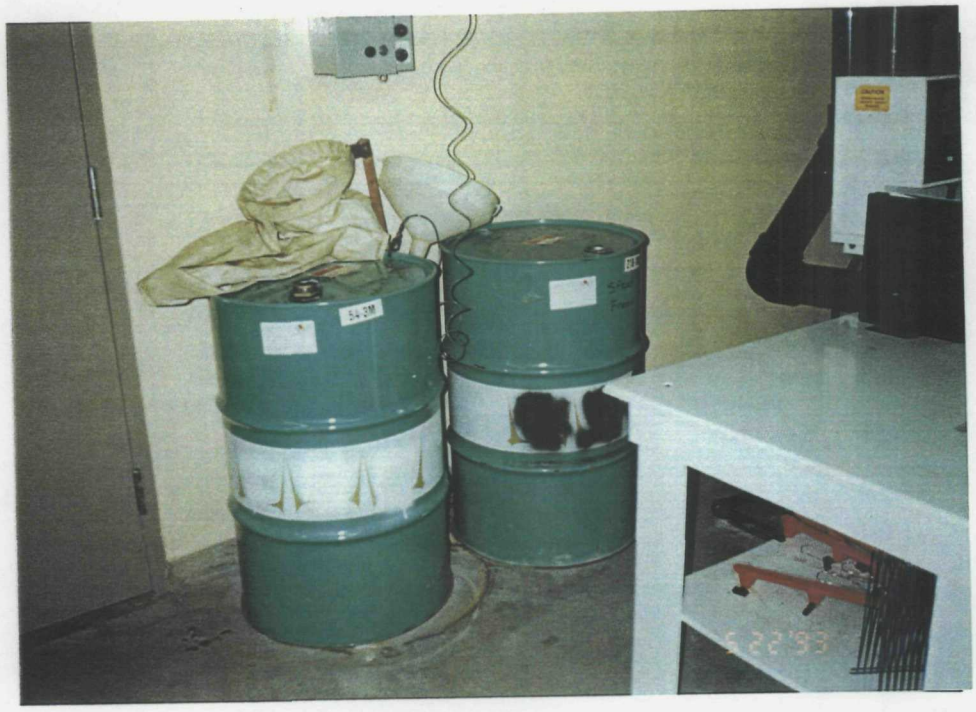
Photograph No. 11 Location: SWMU 7
Orientation: Northwest Date: 05/21/93
Description: Empty 55-gallon plastic drums on west side of driveway in Empty Drum Storage Area (SWMU 7) awaiting pick-up.

Photograph No. 12 Location: SWMU 7
Orientation: Northeast Date: 05/21/93
Description: Empty 55-gallon steel and plastic drums on east side of driveway in Empty Drum Storage Area (SWMU 7) awaiting pickup.

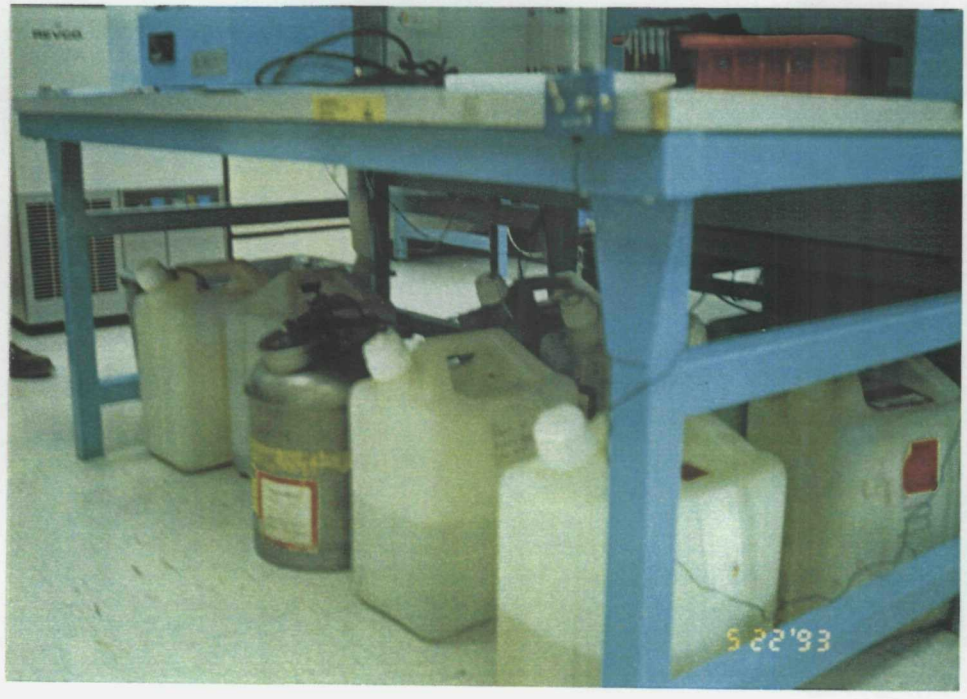


Photograph No. 13 Location: SWMU 8
Orientation: East Date: 05/21/93
Description: Waste caustics (D002, D008) in a satellite accumulation area (SWMU 8) in PWB production area. Etched copper is drying on the table to the left.

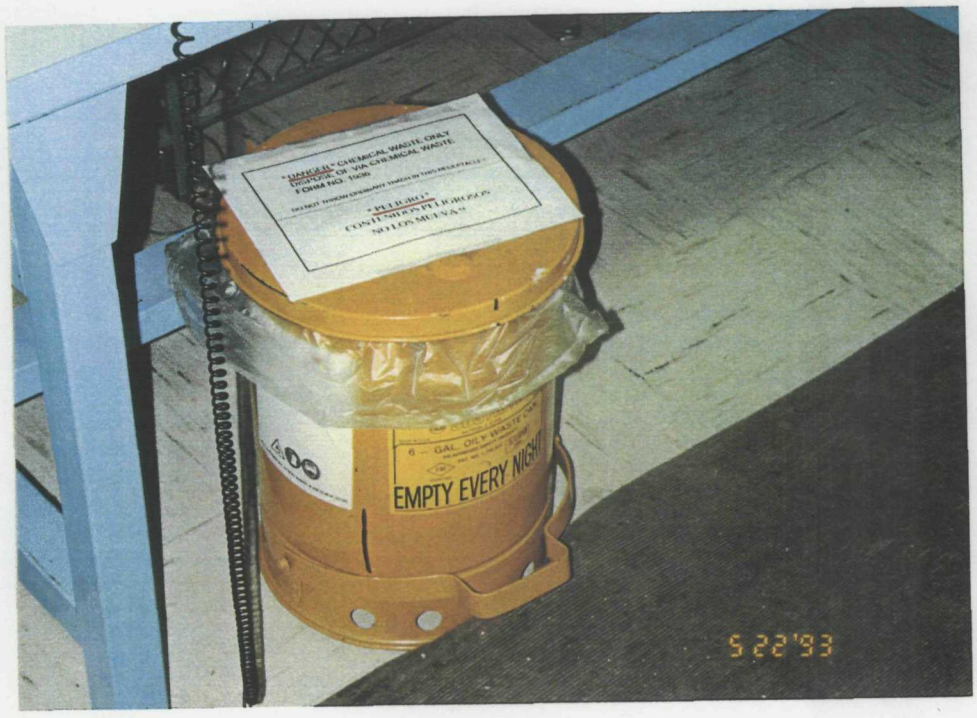
Photograph No. 14 Location: SWMU 8
Orientation: South Date: 05/21/93
Description: Spent photodeveloper (D008) in SAA (SWMU 8).



Photograph No. 15 Location: SWMU 8
Orientation: North Date: 05/21/93
Description: Spent freon (F001) in SAA (SWMU 8).



Photograph No. 16 Location: SWMU 8
Orientation: South Date: 05/21/93
Description: Spent solvents (F001, F002, F003, F005) in SAA (SWMU 8) in the MIC production area.



Photograph No. 17 Location: SWMU 8
Orientation: South Date: 05/21/93
Description: Solvent-contaminated rags (F005, D001, D035) in SAA (SWMU 8).

Photograph No. 18 Location: AOC 1
Orientation: North Date: 05/21/93
Description: Former Underground Storage Tank Location (AOC 1); the tank was located beneath the bushes.

APPENDIX B

VISUAL SITE INSPECTION FIELD NOTES

(16 Pages)

0800 Check in at security desk.
0810 Dave Gurrie picks us up
0815 Meet in conference room to start interview. Jeff describes to my self are here for this inspection.
0820 Dave uses overheads to give a presentation.
MOST manufacturing goes on in 600A Bldg.
Products built here are prototypes, so very little manufacturing goes on.
Manufacturing that does go on is electronic circuit boards.
Build electron tubes.

Stevens 5/21/93

Chemical storage areas on east side of 500 Bldg.
Dave finishes brief overview.
Ed now gives a presentation.
All chemicals that enter the building are reviewed prior to purchase. They look at Health & Safety as well as manufacturing concerns
Corporate is producing an environmental manual.
H&S issues are well thought out & looks like a good program.
Northrop wants to do env. stewardship. Freon reduction & elimination program.

Stevens 5/21/93

(40)

"Resisting" is stripping off an acrylic sheet off the Copper sheeting. This is a alkylin liquid. No metal. Lower the pH and a powder-like substance comes out that is very plastic-like. This will not go through columns. It is sent offsite as a special waste by BFI to a landfill downstate operated by BFI. Gold plating bath creates small amts. The solution is sent to a recycler once per year.

Sivano 5/24/93

(41)

Prior to 1984, everything was drummed and sent to WWTP off site (also in tankers) So F006 was mislabled -- it should not have been on Part A permit application. Dave mentions that Northrop has a waste min program. The largest defense contractor in Illinois.

Northrop Corp. ESD. Rolling Meadows Site.

Ownership is Northrop Corp, a publically held Corp.

Manufacturing ⇒ raw materials Circuit cards; 5-gallon qtys of chemicals is a large amount.

Sivano 5/24/93

(42)

WWTP chemicals are bought in bags + 55 gallons.
Acids + bases are bought in 55 gallon drums.
Lubricants, epoxies, RTV (silicon sealers adhesive), solvents, alcohols, are all purchased in small <5 gallon
Flux, paints, thinners also.
Circuit-board sealants.

0930 Bill Cameron arrives

Most "labs" in this facility are electronics testing - maybe some flux, a little thinner, freon.
No rail line transportation

Stewart 5/21/93

(43)

Wire/Component preparation.
Generates Flux, thinner + Freon. There is a small Container for waste 5-gallon, flamable storage Containers. Once filled (of combustibles) goes to Rm 5097 for flamables. Transferred into 55-gallon drums. When full labled + ready for shipment.
Will notify Safety Kleen for flamable pick up. Fuels recycling. They transport to Akron, IL fuel blending at this location. Then sent to Kilns (by 5/21/93 (S-K will do this).

Stewart 5/21/93

SWMU Reminder checklist:

Date began operations.
Date ceased operating
Construction materials
Dimensions / capacity
Past releases ?
Secondary Containment and other observations.

Northrop tries to keep wastes seperated in different drums.

Printed Circuit Board Assembly.
Freon, Flux + thinner, Coatings (Humiseal, a clear polyurethane sealer). This goes to 5097. Additionally

Stevens 5/21/93

1,1,1 trichloroethane from a solder cleaning (finger cleaner). 5 gallon containers and accumulated in 55 gallons in 5097 room.

Power Supply assembly:
Building amplifiers (some circuit boards) that supply the power to the product. It is also like a transformer. Wastes are Freon, cleaning solvents, ~~meth~~ methylene chloride,
Note: Freon is cascaded ⇒ when dirty, it goes to a bigger degreaser that has a still. Still bottoms go to 5097. This is how most Freon is handled.

Stevens 5/21/93

(46)

Wipe rags come out of all Day Cans, picked up daily. Rineco, Benton Arkansas, grinds them and fuel blends. Rineco used since 1993. Before that incinerated by Ensco (Environmental Systems Company). from El Dorado, Arkansas. Since 1989.

Whenever Northrop chooses a waste handler or disposal facility. it is audited prior to decision and annually. Usually a consultant will do this for Northrop.

Prior to 1989 rags went to L.W.D. Inc. of KY for incineration.

Susan 5/21/93

(47)

Still bottoms go to Safety Kleen who recycles the materials. Dolton, IL facility.

Coil Assembly.

Purchase wire from off site, & coil it. Alcohols are used for cleaning. Wipe Rags are generated

Encapsulation

A silicone rubber is encapsulated around power supplies; some harnesses. Works as insulation, heat sinks. Any left over silicone is

Susan 5/21/93

cured. Swept up off the floor into a waste bin for municipal waste landfilling. Some Rags.

Testing

Some regs. Tests the electronic components.

Printed Wiring Boards.

See handout.

The majority of wastes go to WWTP. Some baths cannot be treated by the plant. They are stored in 55 gallon drums. These are stored in room 6419 (all corrosives come here ↑)

Evans 5/21/93

Ammonia copper etching is reclaimed by the producer CP Inorganics, Inc. Joliet, IL

~~Ferric~~ Ferric chloride hydrochloric acid. Goes to Clean Harbors of Chicago Trailer truck takes drums. Treating waters.

Tin/lead Stripper solution of hydrogen peroxide sodium bifluoride. Goes to Clean Harbors Same as above.

Before WWTP everything was hulked; 1 tanker per week. Pumped out of drums stored in one room. Envirite, Inc.

Evans 5/21/93

(50)

Gold plating bath every 3-5 years 55 gallon drum goes ACR, Inc. in IL. (Suburban Chicago).

Electron Tubes.

A seperate product. One plating area. The solutions are collected in 5 gal drums and accumulated in Room 6419.

Nickle-plating solution. To Clean Harbors.

Acid Brite-dip nitric phosphoric acid. Same as above.

Some Freon + 111 tri goes to 5097.

Evans 5/21/93

(51)

Silver cyanide plating bath. + a copper cyanide plating bath. 55-gallons each once every ~3-years. Goes to ~~Cyanochem~~ $ 5/21/93 Cyano Kem. of Detroit, MI.

Also generates Rags, Freon, 111 tri (ICE) This is the biggest user of TCE. Goes TO room 5097.

M/C/Hybrid Circuits

Building tiny chips. Wastes include degreasing solution Rags, acetone, some toluene,

Evans 5/21/93

(52)

all goes to room 5097.

Engineering generates very small amounts of all chemicals used in throughout the facility. All wastes go to rm 5097.

Developer from photocopiers out as alkyline to Clean Harbors. To room 6419.

Building maintenance sends oils, rags, solvents, paint → 55 gallon drums.

All To Rm 5097.

Stevens 5/21/93

(53)

Reliability Lab generates chromic acid. bulked in Room 6419 & to Clean Harbors. Also has nitric acid, bulked in 6419 w.sh other acids to Clean Harbors.

Many chemicals pass their expiration (shelf life) dates. Once expired goes to room 5097. They try to find non-govt (DOD) product mfg uses of it. Stored in room 5097, but it is not waste yet because they are looking for other

Stevens 5/21/93

(53)

might be coming from neighboring properties. No records exist.

One UST removed in 1977. Contained silicone oil, a coolant from earlier systems (B-52 bombers)

One underground diesel fuel LINE from an above-ground tank. No other tanks

Nothing currently comes over as waste from other Northrop facilities

Air permits (bubbled), about 8.

Evans 5/21/93

(54)

users. Even tho its expired it is not a waste yet.

Room 5057 now storage
6409 is now WWTP.
6407 Chemical storage area.

No wells for closure. Wipe + core samples.

Some groundwater sampling around 1987 after closure
Some wells installed around perimeter in order to precautionary at what

Evans 5/21/93

(56)

Air permit violation of 1990. IEPA wanted NESHAP activities info. IEPA reviewed the info provided by Northrop. A laser trimmer trims off ink on the beryllium oxide. A vacuum cleaner rakes the waste. IEPA said to get the trimmer permitted.

Abrasive cleaner was cleaning BEO ceramics with a gripper blaster. Degreaser doesn't work well (enough) to clean the material. It was not

Susan 5/21/93

(57)

removing any BEO. IEPA wanted this permitted as an air source also. Northrop scientifically figured out the emissions. IEPA didn't like the data. wanted new data within 90 days. Didn't make the deadline & got $10,000 fine.

Northrop Corp owns property

Spill reported in 1992 not necessary to report. A plating bath spilled contained

Susan 5/21/93

lead + cleaned up indoors. Legal Council later decided it wasn't necessary.

Steen on detention basin. (Spring 1992) Found source to be from kerosene wiped on snow-removal equipment from a contractor.

Detention basin collects all storm water collected from the entire property.

~ acres.

Susan 5/21/93

A NPDES permit was filed in mid-1980s (1986) filed because all permits were filed at same time.

1120 Interview ends at 1120

PRC will take photographs + will hand over the film to Northrop. Northrop will develop film, review it for secrecy problems and send PRC 3 copies of all okied photos. PRC will get negatives only if all photos are okid. And we will get negatives only of the okid photos

Susan 5/21/93

(60)

1130 Break for lunch

1200 End Lunch began walkaround.

1215 Observe former UST area.
No observations
Mostly light manufacturing + some transportation companies around the facility.

1232 Shipping area has floor drains outside parallel to Dock
Drains are connected to Storm Water sewers

1245 See empty DSA outdoors.

Stuart 5/21/93

(61)

Segregated by who will picked up by distributors / or mfrs.
No secondary containment
On asphalt that slopes North. Some spilled or stained asphalt north of current drums.
Storm sewer North of it.
All lab sinks in PWB go to WWTP

1315 Observe plating lines.
All waters here go to WWTP. A drum accumulates 9226, a finishing solution (corrosive)
Empty barrels are flow washed

Stuart 5/21/93

(62)

for several minutes.

1335 Enter WWTP area
MEMTEK manufactured the WWTP

Filters are air dried and drummed
Go to 6419.

Observed drums being stored at the north end of the WWTP (see photo 13).
This is here until it is handled
Burned floors.

1355 Enter Closed Room 6407, former waste Storage
Raw materials now Stored

S Evans 5/21/93

(63)

here; Freon & all flammables
Some staining on the floor.
A blow-off roof Burned doorway. Some cracks in middle of the floor.
a grey epoxy paint on the floor has been eroding away.

1400 Room 6419, Corrosive Waste Storage. Area on North side of room has been burned
13 of 55 gallon drums of liquids are full & with labels. All stainless
2 55 gal drums of plating filters. & 55 gal drums of non-regulated drums.

S Evans 5/21/93

(66)

1520 Room 5097. Stains on floors
No floor drains. Under a
hood are drums being filled
5 drums of haz waste
w/ Freon, Humiseal.
Also 6 drums of non-haz
+/or non-regulated waste
Under hood 4 drums
1 5 gallon pail - oil
Humiseal, Kester 5235
(in a 5-gallon). Paint is
in a 5 gallon bucket.
Another non-haz waste
LOTS of "out dated"
materials on shelves.

Evans 5/21/93

(67)

Spill control material
is on shelves.

Hood vents straight out
of doors.

Door is bermed --
actually the room is
lower than the rest of
the building

Good signage. Everything
is grounded!
Blow-off windows.
Drums are wheeled out
of the room to a dock
~ 60 feet away
Stains is LQG

Evans 5/21/93

1550 End walk through.
Go to office and look to see if they filed a Notification of Hazardous Waste Activity Report after Closure. It appears they did not.

Storm sewers discharge into Salt Creek.
Detention pond gets parking lot and roof rain runoff.

1605 Began debriefing meeting.

1620 PRC hands over the roll of film to Ed Glog.

1630 Depart Northrop

Signed 5/21/93

APPENDIX C

SOIL AND GROUNDWATER ANALYTICAL RESULTS

(10 Pages)

ARZYN ENGINEERING
VOLATILE ORGANIC COMPOUND RESULTS
ROJECT: NORTHROP BOUNDARY SURVEY
OCATION: CHICAGO, ILLINOIS
CH: 60222.00

CK'D: KAW APP'D: CAW
DATE ISSUED: 4-9-87

COMPOUND	REPORTABLE DETECTION LIMIT (UG/KG)	14851 B2-1 03/06/87	14852 P1-1 03/06/87	14853 B1-3 03/06/87
ENZENE	50	X	X	X
ROMODICHLOROMETHANE	50	X	X	X
BROMOFORM	100	X	X	X
ARBON TETRACHLORIDE	50	X	X	X
HLOROBENZENE	50	X	X	X
CHLORODIBROMOMETHANE	50	X	X	X
CHLOROETHANE	50	X	X	X
-CHLOROETHYVINYL ETHER	1000	X	X	X
CHLOROFORM	50	X	X	X
1,2-DICHLOROBENZENE	250	X	X	X
3-DICHLOROBENZENE	250	X	X	X
,4-DICHLOROBENZENE	250	X	X	X
1,1-DICHLOROETHANE	50	X	X	X
,2-DICHLOROETHANE	50	X	X	X
-1-DICHLOROETHENE	50	X	X	X
1,2-DICHLOROETHENE	50	X	X	X
-1,3-DICHLOROPROPENE	50	X	X	X
-1,3-DICHLOROPROPENE	50	X	X	X
1,2-DICHLOROPROPANE	50	X	X	X
ETHYLBENZENE	50	X	X	X
ETHYL BROMIDE	100	X	X	X
METHYL CHLORIDE	50	X	X	X
METHYLENE CHLORIDE	1000	X	X	X
,1,2,2-TETRACHLOROETHANE	50	X	X	X
ETRACHLOROETHENE	50	X	X	X
TOLUENE	50	X	X	X
,1,1-TRICHLOROETHANE	50	X	X	X
,1,2-TRICHLOROETHANE	50	X	X	X
TRICHLOROETHENE	50	X	X	X
INYL CHLORIDE	50	X	X	X
YLENES	50	X	X	X

X = ANALYZED, BUT NOT DETECTED.
DL = DETECTED, BUT LESS THAN REPORTABLE DETECTION LIMIT.

CARZYN ENGINEERING
VOLATILE ORGANIC COMPOUND RESULTS
PROJECT: NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS
J#: 60222.00

CK'D: KAW APP'D: CAW
DATE ISSUED: 4-9-87

COMPOUND	REPORTABLE DETECTION LIMIT (UG/KG)	14924 B3-1 03/09/87	14925 B4-2 03/10/87	14927 B5-1 03/10/87	14928 B6-1 03/10/87
BENZENE	50	X	X	X	X
BROMODICHLOROMETHANE	50	X	X	X	X
BROMOFORM	100	X	X	X	X
CARBON TETRACHLORIDE	50	X	X	X	X
CHLOROBENZENE	50	X	X	X	X
CHLORODIBROMOMETHANE	50	X	X	X	X
CHLOROETHANE	50	X	X	X	X
2-CHLOROETHYVINYL ETHER	1000	X	X	X	X
CHLOROFORM	50	X	X	X	X
1,2-DICHLOROBENZENE	250	X	X	X	X
1,3-DICHLOROBENZENE	250	X	X	X	X
1,4-DICHLOROBENZENE	250	X	X	X	X
1,1-DICHLOROETHANE	50	X	X	X	X
1,2-DICHLOROETHANE	50	X	X	X	X
-1-DICHLOROETHENE	50	X	X	X	X
1,2-DICHLOROETHENE	50	X	X	X	X
T-1,3-DICHLOROPROPENE	50	X	X	X	X
-1,3-DICHLOROPROPENE	50	X	X	X	X
,2-DICHLOROPROPANE	50	X	X	X	X
ETHYLBENZENE	50	X	X	X	X
METHYL BROMIDE	100	X	X	X	X
METHYL CHLORIDE	50	X	X	X	X
METHYLENE CHLORIDE	1000	X	X	X	X
1,1,2,2-TETRACHLOROETHANE	50	X	X	X	X
TETRACHLOROETHENE	50	X	X	X	X
TOLUENE	50	X	X	X	X
1,1,1-TRICHLOROETHANE	50	X	X	X	X
1,1,2-TRICHLOROETHANE	50	X	X	X	X
TRICHLOROETHENE	50	X	X	X	X
VINYL CHLORIDE	50	X	X	X	X
XYLENES	50	X	X	X	X

X = ANALYZED, BUT NOT DETECTED.
RMDL = DETECTED, BUT LESS THAN REPORTABLE DETECTION LIMIT.

JAROS ENGINEERING
VOLATILE ORGANIC COMPOUND RESULTS
PROJECT: NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS
J#: 60222.00

CK'D: KAW APP'D: CAW
DATE ISSUED: 4-9-87

COMPOUND	REPORTABLE DETECTION LIMIT (UG/KG)	14929 B6-1 DUP 03/10/87	14932 P11-1 03/11/87	14933 P7-1 03/11/87	14934 P4-1 03/11/87
BENZENE	50	X	X	X	X
BROMODICHLOROMETHANE	50	X	X	X	X
BROMOFORM	100	X	X	X	X
CARBON TETRACHLORIDE	50	X	X	X	X
CHLOROBENZENE	50	X	X	X	X
CHLORODIBROMOMETHANE	50	X	X	X	X
CHLOROETHANE	50	X	X	X	X
2-CHLOROETHYVINYL ETHER	1000	X	X	X	X
CHLOROFORM	50	X	X	X	X
1,2-DICHLOROBENZENE	250	X	X	X	X
1,3-DICHLOROBENZENE	250	X	X	X	X
1,4-DICHLOROBENZENE	250	X	X	X	X
1,1-DICHLOROETHANE	50	X	X	X	X
1,2-DICHLOROETHANE	50	X	X	X	X
1-1-DICHLOROETHENE	50	X	X	X	X
1,2-DICHLOROETHENE	50	X	X	X	X
T-1,3-DICHLOROPROPENE	50	X	X	X	X
C-1,3-DICHLOROPROPENE	50	X	X	X	X
1,2-DICHLOROPROPANE	50	X	X	X	X
ETHYLBENZENE	50	X	X	X	X
METHYL BROMIDE	100	X	X	X	X
METHYL CHLORIDE	50	X	X	X	X
METHYLENE CHLORIDE	1000	X	X	X	X
1,1,2,2-TETRACHLOROETHANE	50	X	X	X	X
TETRACHLOROETHENE	50	X	X	X	X
TOLUENE	50	X	X	X	X
1,1,1-TRICHLOROETHANE	50	X	X	X	X
1,1,2-TRICHLOROETHANE	50	X	X	X	X
TRICHLOROETHENE	50	X	X	X	X
VINYL CHLORIDE	50	X	X	X	X
XYLENES	50	X	X	BMDL	X

X = ANALYZED, BUT NOT DETECTED.
BMDL = DETECTED, BUT LESS THAN REPORTABLE DETECTION LIMIT.

WARZYN ENGINEERING
ANALYTICAL LABORATORY RESULTS

PROJECT: WARZYN ENGINEERING INC.
NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS

CH: 60222.00
DATE SAMPLED: SEE BELOW
CK'D: KAN APP'D: CAW
DATE ISSUED: 4-9-87

LAB #	14930	14931
SAMPLE DESCRIPTION	SOUTH BOUNDARY	EAST BOUNDARY
DATE SAMPLED	03/10/87	03/09/87
ARSENIC	1.92	1.83
BARIUM	<200	<200
CHROMIUM	<20.0	22.8
CADMIUM	<4.00	<4.00
LEAD	<60.0	<60.0
MERCURY	<0.103	<0.084
SELENIUM	<0.50	<0.50
SILVER	<10.0	<10.0

RESULTS ARE REPORTED IN MG/KG DRY WEIGHT BASIS.

WARZYN ENGINEERING
ANALYTICAL LABORATORY RESULTS

PROJECT: WARZYN ENGINEERING INC.
NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS

C#: 60222.00
DATE SAMPLED: 03/06/87
CK'D: KAW APP'D: CAW
DATE ISSUED: 4-14-87 RE-ISSUED

LAB #	14850
SAMPLE DESCRIPTION	NORTH BOUNDARY
ARSENIC	1.68
BARIUM	<200
CADMIUM	<4.00
CHROMIUM	46.5
LEAD	69.7
MERCURY	<0.101
SELENIUM	<0.500
SILVER	<10.0

RESULTS ARE REPORTED IN MG/KG DRY WEIGHT BASIS.

HAZLETON LABORATORIES AMERICA, INC. Chemical & BioMedical Sciences
3301 KINSMAN BLVD. • P.O. BOX 7545 • MADISON, WISCONSIN 53707 • PHONE (608) 241-4471 • TLX 703956 HAZRAL M

REPORT OF ANALYSIS

SOIL SAMPLE

ELWOOD
YN ENGINEERING, INC.
IENCE COURT
RSITY RESEARCH PARK
SON, WI 53705

SAMPLE NUMBER: 70 22
DATE ENTERED: 03 12/
REPORT PRINTED: 03, 17/

4926 84-1

E ORDER NUMBER: 60222.00-3/12/87

FORMALDEHYDE

LESS THAN 10.0 PPM

OD REFERENCE

OSH P & CAM 125 WITH MODIFICATIONS PER HAZLETON LABORATORY WORKSHEET XX NUMBER 5016.

OD REFERENCES

IAL ANALYSIS: ASSAY NAME AND METHOD LISTED ABOVE WITH RESULTS

WARZYN ENGINEERING
VOLATILE ORGANIC COMPOUND RESULTS
PROJECT: NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS
C#: 60222.00

CK'D: KAW APP'D: CAW
DATE ISSUED: 4-9-87

COMPOUND	REPORTABLE DETECTION LIMIT (UG/L)	15264 B1 03/26/87	15265 B2 03/26/87	15266 B3 03/26/87	15267 B4 03/26/87
BENZENE	1.0	X	X	X	X
BROMODICHLOROMETHANE	1.0	X	X	X	X
BROMOFORM	2.0	X	3.6	X	X
CARBON TETRACHLORIDE	1.0	X	X	X	X
CHLOROBENZENE	1.0	X	X	X	X
CHLORODIBROMOMETHANE	1.0	X	X	X	X
CHLOROETHANE	1.0	X	X	X	X
2-CHLOROETHYVINYL ETHER	20	X	X	X	X
CHLOROFORM	1.0	X	X	X	X
1,2-DICHLOROBENZENE	5.0	X	X	X	X
1,3-DICHLOROBENZENE	5.0	X	X	X	X
1,4-DICHLOROBENZENE	5.0	X	X	X	X
1,1-DICHLOROETHANE	1.0	X	X	X	X
1,2-DICHLOROETHANE	1.0	X	X	X	X
1,1-DICHLOROETHENE	1.0	X	X	X	X
1,2-DICHLOROETHENE	1.0	X	X	X	X
cis-1,3-DICHLOROPROPENE	1.0	X	X	X	X
trans-1,3-DICHLOROPROPENE	1.0	X	X	X	X
1,2-DICHLOROPROPANE	1.0	X	X	X	X
ETHYLBENZENE	1.0	X	X	X	X
METHYL BROMIDE	2.0	X	X	X	X
METHYL CHLORIDE	1.0	X	X	X	X
METHYLENE CHLORIDE	1.0	X	X	X	X
1,1,2,2-TETRACHLOROETHANE	1.0	X	X	X	X
TETRACHLOROETHENE	1.0	X	X	X	X
TOLUENE	1.0	X	X	BMDL	X
1,1,1-TRICHLOROETHANE	1.0	X	X	X	X
1,1,2-TRICHLOROETHANE	1.0	X	X	X	X
TRICHLOROETHENE	1.0	X	X	X	X
VINYL CHLORIDE	1.0	X	X	X	X
XYLENES	1.0	X	X	X	X

X = ANALYZED, BUT NOT DETECTED.
BMDL = DETECTED, BUT LESS THAN REPORTABLE DETECTION LIMIT.

WARZYN ENGINEERING
OLATILE ORGANIC COMPOUND RESULTS
ROJECT: NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS
#: 60222.00

CK'D: KAW APP'D: CAW
DATE ISSUED: 4-9-87

COMPOUND	REPORTABLE DETECTION LIMIT (UG/L)	15268 B5 03/26/87	15269 B6 03/26/87	15270 EQUIPMENT BLANK 03/26/87	15271 TRIP BLANK 03/26/87	15272 B1 FIELD DUP 03/26/87
ENZENE	1.0	X	X	X	X	X
BROMODICHLOROMETHANE	1.0	X	X	X	X	X
ROMOFORM	2.0	X	X	X	X	X
ARBON TETRACHLORIDE	1.0	X	X	X	X	X
CHLOROBENZENE	1.0	X	X	X	X	X
HLORODIBROMOMETHANE	1.0	X	X	X	X	X
HLOROETHANE	1.0	X	X	X	X	X
2-CHLOROETHYVINYL ETHER	20	X	X	X	X	X
HLOROFORM	1.0	X	X	X	X	X
,2-DICHLOROBENZENE	5.0	X	X	X	X	X
1,3-DICHLOROBENZENE	5.0	X	X	X	X	X
1,4-DICHLOROBENZENE	5.0	X	X	X	X	X
,1-DICHLOROETHANE	1.0	X	X	X	X	X
,2-DICHLOROETHANE	1.0	X	X	X	X	X
1-1-DICHLOROETHENE	1.0	X	X	X	X	X
,2-DICHLOROETHENE	1.0	X	X	X	X	X
-1,3-DICHLOROPROPENE	1.0	X	X	X	X	X
C-1,3-DICHLOROPROPENE	1.0	X	X	X	X	X
,2-DICHLOROPROPANE	1.0	X	X	X	X	X
THYLBENZENE	1.0	X	X	X	X	X
METHYL BROMIDE	2.0	X	X	X	X	X
METHYL CHLORIDE	1.0	X	X	X	X	X
ETHYLENE CHLORIDE	1.0	X	X	X	X	X
1,1,2,2-TETRACHLOROETHANE	1.0	X	X	X	X	X
TETRACHLOROETHENE	1.0	X	X	X	X	X
OLUENE	1.0	BMDL	X	2.0	2.0	X
1,1,1-TRICHLOROETHANE	1.0	X	X	X	X	X
1,1,2-TRICHLOROETHANE	1.0	X	X	X	X	X
RICHLOROETHENE	1.0	X	X	X	X	X
INYL CHLORIDE	1.0	X	X	X	X	X
XYLENES	1.0	X	X	X	X	X

= ANALYZED, BUT NOT DETECTED.
BMDL = DETECTED, BUT LESS THAN REPORTABLE DETECTION LIMIT.

WARZYN ENGINEERING
ANALYTICAL LABORATORY RESULTS

PROJECT: WARZYN ENGINEERING INC.
NORTHROP BOUNDARY SURVEY
LOCATION: CHICAGO, ILLINOIS

C#: 60222.00
DATE SAMPLED: 03/26/87
CK'D: KAW APP'D: CAW
DATE ISSUED: 4-9-87

LAB #	SAMPLE DESCRIPTION	CALCIUM	CHLORIDE
15273	B3	189	395

RESULTS ARE REPORTED IN MG/L.

Chemica & BioMedical Sciences Division
3301 KINSMAN BLVD. • P.O. BOX 7545 • MADISON, WISCONSIN 53707 • PHONE (608) 241-4471 • TLX 703956 HAZRAL MDS UD

REPORT OF ANALYSIS

WATER SAMPLE

.N ELWOOD
RZYN ENGINEERING, INC.
SCIENCE COURT
IVERSITY RESEARCH PARK
DISON, WI 53705

SAMPLE NUMBER: 7030526
DATE ENTERED: 03/27/8
REPORT PRINTED: 04/06/8

TER: WEI # 15267, B4

RCHASE ORDER NUMBER: 60222.00-3/27/87

RMALDEHYDE BY CHROMOTROPIC ACID

LESS THAN 5 PPM

ETHOD REFERENCE

)SH P&CAM 125.

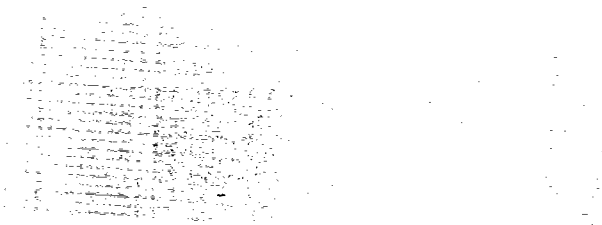
METHOD REFERENCES

PECIAL ANALYSIS: ASSAY NAME AND METHOD LISTED ABOVE WITH RESULTS

APPENDIX D

SOIL BORING LOG

(1 Page)



WARZYN

LOG OF TEST BORING

Project: Environmental Boundary Survey
600 Hicks Road - Northrop
Location: Rolling Meadows, Illinois

Boring No. P-9
Surface Elevation
Job No. 60222
Sheet 1 of 1

WARZYN ENGINEERING INC. • ONE SCIENCE COURT • UNIVERSITY RESEARCH PARK • P.O. BOX 5385 • MADISON, WISCONSIN 53705

SAMPLE Recovery Type	SAMPLE Moisture	SAMPLE N	Depth	VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES qu	W	LL	PL	D
			0	Mottled Yellow Brown with Dark Brown to Black Clayey SAND, Some Fine and Coarse Gravel (SC)					
			2	Black Silty CLAY, Trace Fine Sand (CL)					
			4	Strong Fuel Oil Odor					
			6	Mottled, Light Gray with Yellow Olive Brown Clayey SILT, Trace Fine to Coarse Sand and Fine Gravel (ML)					
			8						
			10	End Probe at 8.5'					
			12	Probe backfilled immediately with cuttings.					
			14						
			16						

WATER LEVEL OBSERVATIONS

Dry

While Drilling
Upon Completion of Drilling
Time After Drilling
Depth to Water
Depth to Cave In

GENERAL NOTES

Start 3/11/87 Complete 3/11/87
Crew Chief SYL Rig CME 55
Drilling Method 4"OD FA